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BULLETIN OF THE HISTORY OF MEDICINE

ORGAN OF THE AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE AND THE JOHNS HOPKINS INSTITUTE OF THE HISTORY OF MEDICINE

Editor—HENRY E. SIGERIST

Associate Editor—GENEVIEVE MILLER

VOLUME XXI NOVEMBER–DECEMBER, 1947 NUMBER 6

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THE JOHNS HOPKINS PRESS

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Correspondence relating to the publication of papers should be addressed to The Editor, Bulletin of the History of Medicine, 1900 East Monument Street, Baltimore—5, Maryland, U. S. A.

Twenty-five reprints without covers will be furnished to contributors free of cost. An order slip for additional reprints, giving the cost, is sent with the galley proof to each contributor and must be returned immediately to the Editor.

The journal is published bimonthly. One volume of at least 500 pages is published during the year.

Subscription is $5.00 a year in the United States and its possessions; in Canada $5.25 a year; in foreign countries $5.50 a year. Single numbers, when available, will be $1.00 each. Members of the American Association of the History of Medicine receive the Bulletin on payment of $5.00 annual dues, of which $4.00 is for a year's subscription to the Bulletin.

This journal will publish book reviews, and publishers are requested to send review copies to the Editor.

Back numbers of Volumes II to VIII of the Bulletin of the History of Medicine are available through the Johns Hopkins Press for $5.00 a volume, of Volumes IX to XX for $2.50 each. Volume I is out of print.

Supplements to the Bulletin are published at irregular intervals and are sold individually, whereby subscribers to the Bulletin are granted a reduction of price. Standing orders for the whole series of Supplements may be addressed to

THE JOHNS HOPKINS PRESS

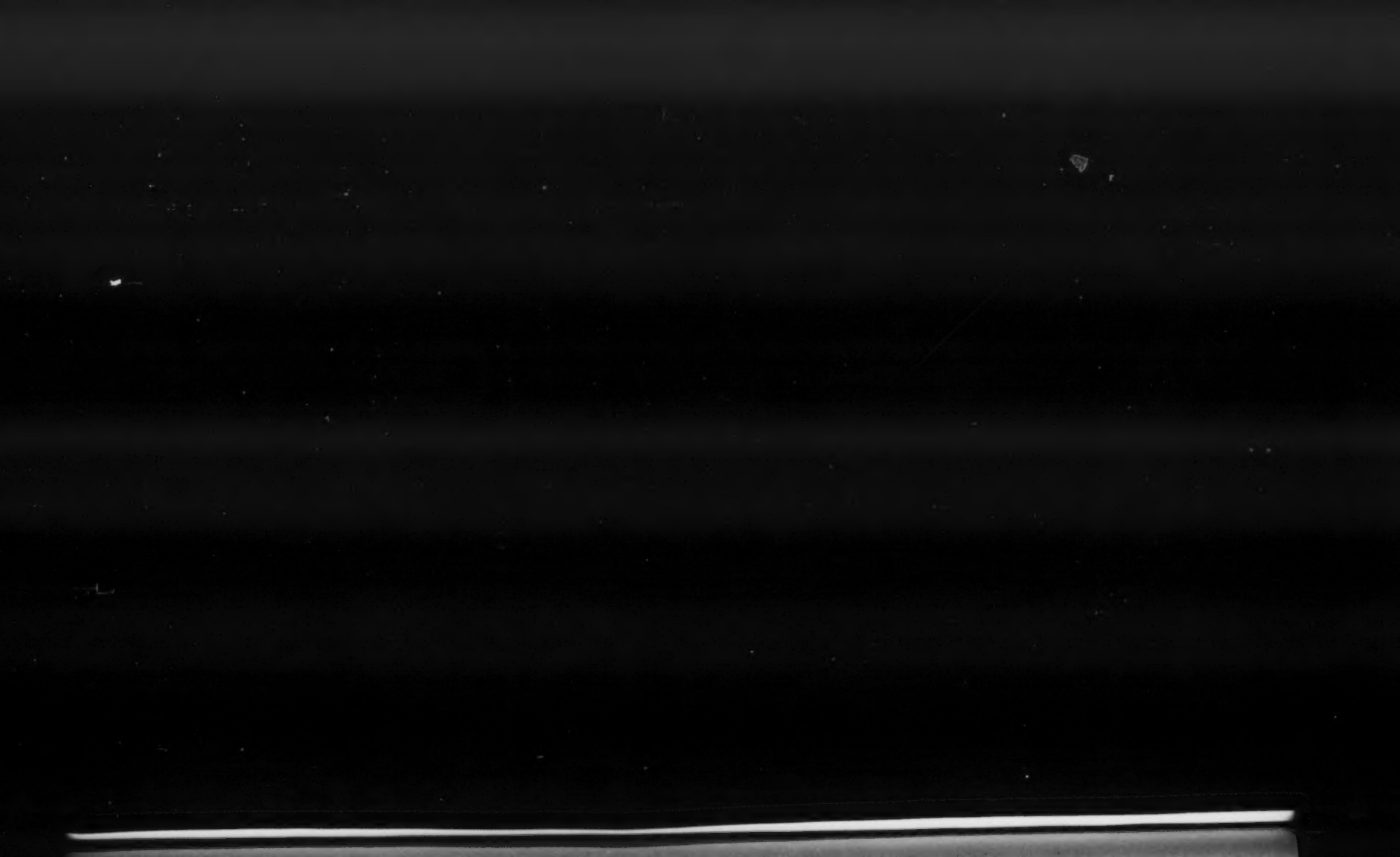
BALTIMORE 18, MARYLAND, U. S. A.

PUBLISHED BIMONTHLY

January-February, March-April, May-June, July-August, September-October, November-December

Made in United States of America

Entered as second-class matter January 3, 1935, at the post office at Baltimore, Maryland, under the Act of March 3, 1879.



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NOT FAMOUS MEN, BUT GREAT TEACHERS *

SOME PERSONAL EXPERIENCES

ERWIN H. ACKERKNECHT

Through what is perhaps more than an accident, a great many of those interested in medical history are at the same time connected in some way with medical education. Thus, in our double capacity as historians of medicine and as educators, we cannot help stumbling again and again over the problem of the "ideal" teacher, his nature, formation, role and fate. As teachers we must always be mindful of our dangerous power to awaken in a student a lifelong interest for a particular field—or a lifelong aversion. As historians of medicine, ever since we studied the Oath of Hippocrates for the first time, we have been conscious of the great role that the teacher

* This paper was read on May 14, 1947 in the William Snow Miller Seminar for Medical History, Madison, Wisconsin. Moderator, Dr. W. J. Meek. (Concerning the history of our seminar see Garrison, F. H., *William Snow Miller Festschrift*, Menasha, Wis., 1928, p. 128 ff., and Middleton, W. S., *Bull. of the Hist. of Med.*, 1940, 8: 1076 ff.). Though the subject has been on my mind for a long time, I would have preferred to deliver it some 20 years from now when age and achievement might better justify the reminiscent attitude and the frequent use of "I." Yet circumstances extraneous to my will produced this improvisation which might find its excuse in the importance of the problem and in provoking better studies along similar lines.

plays in medical history. This role does not seem to be appreciated to its full extent in all quarters. I recently read in a fine little treatise on medical education the statement that "good doctors seem to know quite early in life what they intend to do." In view of the historical record, I am obliged to disagree. Even with the "good doctors" a number of relatively late accidents are often the determining factors in their decision, and not the least among those accidents, in a positive and negative way, are teachers. I am, for instance, rather convinced that we would not have to speak of "Darwinism" today but of "Wallacism" or something else, if Darwin had not heard his first lectures in anatomy under Alexander Monro III who, in 1825, still read without any change the lecture manuscripts prepared by his grandfather more than a century before. I might remind you of the fact that Pettenkofer started life as an actor, Claude Bernard and Brown-Séquard as dramatists, Boerhaave and Morton as theologists. The fame of a great doctor is, on the other hand, often largely dependent on his ability as a teacher. There are more than a few great men in medical history, like Boerhaave or Johannes Mueller, whose fame cannot be understood on the force of their scientific records alone. Boerhaave's medical writings make rather disappointing reading today, but out of his teaching came Monro I's and Cullen's Edinburgh (whose spiritual child was Morgan's and Rush's Philadelphia); and van Swieten's Vienna; and Haller and Goettingen; and Tronchin, one of the few sound Paris clinicians of the day; and even the rebellious philosopher La Mettrie. There seems to me also little doubt that Johannes Mueller would not loom so large in the history of medicine had he not inspired and formed a Schwann, a Henle, a Koelliker, a Virchow, a Du Bois-Reymond, a Helmholtz, a Bidder—to name only a few of his pupils. Among the French clinicians of the first half of the nineteenth century there are several who, scientifically, are certainly not inferior to Pierre Louis. Yet, through his numerous devoted and brilliant pupils, Louis is today better remembered than any one of them. Bretonneau did most valuable work in his provincial Tours, but who would have heard of him without his pupils, Trousseau and Velpeau, enthusiastically spreading his message in Paris? The most extreme case is probably that of Kielmeyer of Stuttgart, the teacher of Cuvier, of

whom we have nothing in print except a few rather colorless commencement addresses. And yet all of his pupils, many of them great naturalists of their time, spoke of Kielmeyer as if they had been only dwarfs in comparison to him. On the other hand, a man like Robert Koch, who avowedly lacked the talent of teaching and making pupils, stands in medical history a gray, lonely, drab, little old German professor in spite of all his great accomplishments, while Pasteur, who had not only the gift to find bacteria but also to inspire pupils, is surrounded by the light that his great pupils reflected on him.

I think it is thus quite obvious—to use a metaphor from genetics—that the gene for teaching and the gene for scientific accomplishments are two separate genes which need not always be combined in the same person. On the contrary, I feel—and I trust that I am not the only one who has had this experience—that as far as inspiration goes, we often owe much more to a few of our teachers who have not been famous at all, than to those who had achieved international recognition. I have been, for instance, a pupil of Aschoff and Lubarsch in pathological anatomy; of Eppinger, Friedrich Kraus and the younger His in internal medicine; and of Eiselsberg, Bier, and Lexer in surgery. But, except for Lexer, I must say that although these men impressed me greatly, and although I learned a great deal from them, none of them inspired me with the love, the respect, the enthusiasm for our science and our calling that one needs in order to carry on and to be happy in it for a lifetime. I do not think that it is primarily because these men talked over our heads, or because technically they were not very good teachers; some, like Eppinger, were even very clever teachers. Teaching, especially in our profession, is much less a question of formal instruction than of providing an example, following which the pupil can act and form his life. There are positive and negative traits in the very famous and successful which render imitation difficult or undesirable. It seems to me that most of the very famous men lacked or had lost something in their character which the otherwise lesser men had. Love for our calling and enthusiasm for our science, an ideal to strive for, was given to me by men whose names you probably never heard—*Ernst Neisser, Louis Lewin, and Alois Pick. I am speaking of them not only in deference to them as individuals, but in deference to a*

whole category of persons, to those minor scientists but major teachers with whom medical history in general does not deal very generously. For one more reason I am glad that I am afforded the opportunity to remember publicly these three men. By accident they were, like so many outstanding medical men in Germany, born as Jewish Germans, while I, by another accident, happened to be born an "Aryan" German, a difference of which I was not even conscious for many years. Unfortunately others were, and in a spirit which we had hoped had died out with the witch doctor and the inquisitor. I am therefore grateful that I am free here to testify for these three men whose books have been banished and whose kin were hunted and destroyed during the last 15 years in the country they had served so honorably.

The first of these teachers of mine was *Ernst Neisser.* I worked first under him as a "famulus" in 1926. He was then 63 years old, and thus the "youngest" of the three men when I met them. You have all heard of Neisser's cousin, Albert, who discovered the gonococcus; you might have heard of his brother, Max, who was a pupil of Ehrlich; or of his cousin, Clemens, who was an outstanding psychiatrist; but you are not very likely to have heard of Ernst Neisser. Yet he was a competent and distinguished medical man. He was born on May 16, 1863 in Liegnitz, Silesia, and studied at the Universities of Berlin, Breslau, Freiburg, and Heidelberg where he graduated in 1888. After having studied with Robert Koch and Fraenkel, he went in 1893 to Koenigsberg as a privatdocent. After a short while it became obvious that he was suffering from pulmonary tuberculosis, and he went to Egypt. His university career, interrupted at that moment—as was, by the way, Paul Ehrlich's under similar circumstances—was never taken up again. When he came back from Egypt, he accepted the position of director of the medical division of the city hospital in my home town of Stettin in 1895. Here Neisser worked until 1931 when he was retired, having reached the age limit. He was still in full vigor, and therefore became the director of a sanitarium in the spa of Altheide. I suspect that his desire to go on working was influenced by the fact that in 1929 he had lost his only son who died of septicemia during his final medical examinations. In 1933 Ernst Neisser was driven out of his sani-

tarium by the Nazis. He went to Berlin, as the big city offered relatively better conditions for the persecuted Jews, and went on practising effectively. The last ten years of his life were a nightmare. His wife, suffering from cancer and depressive paranoic ideas, committed suicide. Although he had a Swedish visa, Neisser was not allowed to go abroad, and in December 1943, in his 81st year, when he received orders to go to one of the death camps, he preferred to end his life himself with dignity. Though he had been suffering from angina pectoris for 15 years, his circulation proved, unfortunately, strong enough for a 24 hour agony. In spite of all the sufferings of his last years, Neisser never lost his composure, his quiet friendliness, and his wisdom.

Neisser is mentioned in German medical textbooks, in general, for the brain ventricle puncture which he introduced in 1904. He had a number of other minor scientific accomplishments to his credit, like isolation of the diplococcus in an inflamed joint. He was a pioneer of systematic anti-tuberculosis work. He was known for a treatment of pernicious anemia by massive doses of arsenic (Arsenstoss). Yet it is typical of Neisser that as soon as news of Minot's work was received in his clinic, liver was tried, and when found successful, replaced all other methods of treatment. I will not go into more detail here concerning Ernst Neisser's scientific accomplishments because this is not the point I wanted to make today. At the time I learned to admire Neisser, I knew little of all this. What impressed me so greatly in Ernst Neisser was, rather, the ideal and rare combination of a competent scientist, an able clinician and diagnostician, a sensible therapist, a most human doctor, and a man truly cultured in many fields. Perhaps I was so impressed by Neisser because I had just come from studying with Eppinger, who ended his life by an ignominious suicide two years ago. (Eppinger was involved in the notorious human experiments of the Nazis, a thing which did not surprise me in the least, because Eppinger always handled the patient as coldly as if he were a dead object.) Thus I now felt greatly relieved to see a man who would not only be able to make a good diagnosis and follow up the scientific potentialities of a case, but who would also give almost immediately to the most anxious and disturbed patient the reassurance he needed.

Neisser was widely read in general literature. He had a beautiful collection of modern paintings, and developed into an able painter himself in the later years of his life. He learned to play the piano at the age of 50. He was a passionate hunter. Externally he was unimpressive, except for his beautiful, lively eyes. A short, slender man who became gray and bald early in life, he was very unassuming and quiet, yet not without a certain sly sense of humor, which he was not afraid to practise on himself when telling us for our own good of some curious diagnostic error of his.

The setting in which I met *Louis Lewin* for the first time, in this same year of 1926, was anything but awe inspiring: A living room in an old tenement house in the center of Berlin, fitted to harbor some forty to sixty students with a number of most rudimentary benches, a table in front with a marble top which had a more than incidental resemblance to the marble tops over which the grocers used to hand out their wares at that time, and a little old man who looked his 76 years in an old-fashioned, long black tail-coat, looking rather absent-mindedly through a pair of old-fashioned glasses. Most of us probably had come there out of curiosity, rather than positive interest in toxicology, the subject to be taught. And yet, the old man had said only a few sentences and we were spellbound. He told us the data with such an extraordinary contagious enthusiasm, he performed his little experiments with such loving care, and behind each of his sentences there was such a deep faith in science, such an unlimited devotion to the search for the truth, that nobody could remain indifferent. His data were interesting and important after all. But I am convinced that Louis Lewin would have made us love even osteology. He was the survivor of a period when science had not yet been submitted to nationalism. He would quote in foreign languages without any hesitation and in a flawless way. We all felt very provincial when we saw him marshal facts from all four corners of the world and all periods of history. By that time I was in my third medical year. I had been impressed by the clinic from the very beginning, but I think that only then did I learn the beauty and obligations of science from Louis Lewin.

Louis Lewin was born in 1850 in Tuchel in Western Prussia. He graduated from the University of Berlin in 1875 as an M. D., studied

for a while with Pettenkofer and Voit in Munich, and became privatdocent for pharmacology in Berlin in 1881. In 1894 he was made titulary professor, and herewith his academic career ended. It is well known that he could have become head of the greatest pharmacology department in Germany had he consented to become baptized and do what the poet Heinrich Heine once cynically called "taking the entrance ticket to society." But Lewin, though not a very orthodox person, did not feel this way. He preferred to teach and to do research with his own means in the strange surroundings I have described above. Financially he was partly enabled to do so through the fact that, although he had no official position, the courts valued him above all other experts in Germany in his chosen field. In 1928 Louis Lewin had a stroke from which he never completely recovered. Working even on his deathbed, he died on December 1, 1929.

Lewin did an enormous amount of original research. One of his main fields was what he called "Phantastica"—opium, as well as other exotic narcotics. He worked first on the alkoloid principle of the Mexican "peyote" plants, for example, and one of the cactuses is named after him—"Anhalonium Lewini." He did pioneer work on carbon monoxide poisoning, its diagnosis through spectral analysis, and on a great number of other blood poisons, solvents included. He therefore made very important contributions to occupational medicine and hygiene, and his treatises in this field have been very widely translated. He also did research on the different arrow poisons which usually contain glucosides like strophantine, with a particular effect on the heart. Besides his original research, Lewin wrote some great textbooks, as the one in 1881 on the untoward side-effects of drugs, or his textbook on toxicology of 1885. Those books were translated and edited up to the time of his death. Finally, Lewin was a distinguished medical historian and anthropologist, giving the history of the abortion-producing drugs in 1904, the unique book on arrow poisons in 1894, and eventually his monumental work on poisons in history in 1907. Those interested in a more detailed analysis and bibliography of Lewin's scientific work should consult David Macht's paper in the *Annals of Medical History*, 3:179, 1931. The foregoing shows that Lewin was

certainly widely known and respected, and I have doubted whether I was actually entitled to include him among my "not famous" teachers. Yet, the lack of official recognition gave him, in a country where the State has held an educational monopoly for hundreds of years, a position of an outsider which, I think, justifies my procedure.

Lewin had the ability to compress his teaching into a significant anecdote. I think none of us, for instance, has ever forgotten that chromic acid is just not the right thing with which to treat perspiration of the feet after we heard the story of the doctor who, taking a graduate course with Lewin and hearing that chromic acid was toxic, broke into rather noisy laughter. When asked the reason for this reaction, he told Lewin and the others that he had used chromic acid on himself for years, and would submit his urine immediately for a test in order to show that that story of chromic acid nephritis was just another laboratory man's legend. The doctor delivered the specimen, Lewin heated it over the Bunsen, "and gentlemen, when your colleague saw the albumen coagulate heavily in that test tube his face was as white as the marble top of this table, because in this test tube, gentlemen, he had read his own death verdict."

Of all my "not famous" teachers, the least known is probably *Alois Pick* of Vienna who was born in Prague in 1859. He had no aspirations of personal glory. He used to say to us that he would be perfectly satisfied if, as far as fame goes, he would get one single line in Struempell's big textbook of internal diseases. He got this line, because as an army medical officer in 1886 he was the first to describe the Pappataci fever, one of the lesser known Rickettsia diseases of Eastern Europe. Pick had studied in Prague and Vienna, and graduated in 1883 in his home town. He was an army medical officer until 1918 when he retired with the rank of brigadier general. He then became a professor in the University of Vienna. He has published lectures on gastro-intestinal diseases and a book on clinical semiotic.

We were only a small crowd who followed his lectures on gastro-intestinal diseases, but I think no one ever regretted that he went to Pick rather than to the crowded halls of Wagner-Jauregg or Wenckebach. Pick was a very tall and rather voluminous individual. In a way he resembled the good elephant in our modern children's

books. What struck me very much, or for that matter everybody conversant with the customary behavior of German professors or army officers of his generation, was his extreme kindness, not only with his patients, but also with his students. Coming to his lecture meant shaking hands with him like meeting a long lost friend. But Pick was more than just a well-informed man and a gentle soul. Today his teaching would be regarded as " psychosomatic medicine." Pick showed us in an unpretentious way what nobody else seemed to show us at that period—that gastro-intestinal troubles are not exclusively a question of diet or of increased hydrochloric acid production, but have a lot to do, for instance, with the family situation of the patient. He had been a lifelong friend of Freud, but was rather amused by the extreme notions of his classmate. He was very tactful in questioning the patient in the presence of students, and yet he always got what he wanted; and, with an almost imperceptible smile, would nod to us that here we had touched the real thing. At the same time, Pick did his very best to increase our knowledge of simple methods of physical examination, and as far as he himself was concerned, he was indeed able to get—by palpation and auscultation—a lot of anatomical detail which most of us today will only learn (or not learn) from the X-ray. Pick was about 68 when I studied with him in 1927. In 1934 the medical journals of Vienna described him as " still very vigorous " on his 75th birthday. Pick was still alive when the Nazis invaded Austria in 1938. But a miraculous combination of circumstances saved him from what seemed an unavoidable destiny: ending in an extermination camp. That he could die in relative peace in the Jewish home for the aged in Seegasse, Vienna, in 1945 at the age of 86 is mainly due to the heroic devotion of an aged " Aryan " female servant of the family. She even married the former general, who had now become an outlaw, in order to protect him more effectively. The fact that Pick was able, under the most averse circumstances, to force from fate at least a peaceful end tells perhaps better than anything I could say that my least known teacher *was* an unusual man.

These thumbnail sketches are an attempt to contribute some data to a relatively little cultivated field of medical history, the history of the " unknown doctor " to whom Sigerist once dedicated his *Great*

Doctors. Seen against the background of present-day devastated Europe where many 20th century books have become greater rarities than 16th century books are here, these reminiscences have perhaps more of an " historical " ring than many materials from the 17th or early 19th centuries. One has to admit the disagreeable truth that the world in which these men grew, lived, and worked is gone. And yet, as long as Western Civilization wants to live and will be alive, their basic ideals and values will remain exemplary.

THE CONTRIBUTION OF GENEVA PHYSICIANS TO THE PHYSIOLOGY OF DEVELOPMENT IN THE 19TH CENTURY

HEINRICH BUESS

> This earthly body, then, is but the nursery ground, in which the intellectual heritage of man grows profusely, and the history of nature is but the history of the progressive victories of mind over matter. That is the fundamental idea of creation; not for its pleasure but for its accomplishment, nature allows individuals and whole generations to disappear, and raises the present time on the scaffolding of an unmeasured past.
>
> Translation from K. E. v. Baer, *Speeches*, 1st Part, page 71 et seq.

The great men in the history of research have at all times been interested in the study of development: and again and again the most scholarly natural philosophers have been attracted by the mysterious processes connected with the origin and development of the individual. One recalls names like those of Aristotle who was the first to examine the actual development of the chicken, of Harvey who postulated the ovum as the origin of all individual growth, and of Haller and Baer who made fundamental discoveries concerning the development of certain organs.

It is all the more astonishing that to this very day the historians of clinical discipline have neglected embryology. I think especially of the physiology of development of the nineteenth century. The morphological and genealogical aspects of embryology have been better treated, if we consider for instance the prolific literature on the theory of evolution and the historical surveys on the theory of descent. What is still missing, however, is an exact appreciation of the different stages of experimental research on fertilization.

This is all the more disappointing to Swiss physicians, as some leading men in this line were Swiss, and especially Swiss of Geneva, the town which interests us at the moment. One cannot help wondering whether the exploits of these men were sufficiently appreciated

by their colleagues. But even a slight knowledge of the development of natural science in Geneva will show that this is not the case.

And yet not many towns in Switzerland have a record of so many biologists as Geneva. Since Calvin's time in this town a great scientific activity has been displayed. In the beginning all study centered in theology; but towards the end of the seventeenth century the Doctors of Divinity had to share their prerogative with the doctors of medicine. This change was brought about, as it seems to me, especially by medical literature. If for centuries the Geneva physicians had to do without institutes or laboratories of their own, independent research flourished all the more. Charles Bonnet, Abraham Trembley, the Huber brothers and Louis Jurine, following the tradition of the bulky compilation of men like Théophile Bonet, Leclerc and Manget, and influenced by the embryologists of the French and Italian speaking countries, decided to seek the laws of fertilization among primitive animal forms. Our doctrine of regeneration and a large part of the entomology of today are based on their work.

A second high tide began with the nineteenth century, when more universal principles established themselves in botany, when the latter was freed from the fetters of mere morphology and systematology. Here too Geneva men, Candolle the elder, and de Saussure the younger, were among the pioneers in the field of plant physiology and plant geography. Also the chemist Gaspard de la Rive was of definite influence. A circle of learned physicians was formed, many of whom were later to achieve much in their various fields, and to establish Geneva's fame for medical pioneer work. Today we shall chiefly deal with Jean-Louis Prévost the elder (1790-1850) and Hermann Fol (1845-1892), both biologists and both literary men.

Let us first turn to Prévost.[1] He was the descendant of an old family which had settled at Geneva centuries ago. His father was a well-known merchant who had destined his son to ecclesiastical study, on which he was engaged for fully three years. The choice of this profession may have been influenced by the superior standing which attached to the study of Divinity. Shortly before taking his degree, however, Prévost who had always been noted for his exact observation, decided to take up medicine. His decision seems to have been

[1] To J.-L. Prévost, see Sources (Gosse, Lebert, Montet, Hofmann).

influenced by Pierre Prévost (1751-1839) and Marc Auguste Pictet (1752-1825), professors of Physics at the "Académie." Later in spite of the political troubles, he went to Paris in 1814, in order to study medicine. He eagerly absorbed all that this new branch of learning could give him. Medicine in Paris still reflected some of the mighty influence of Xavier Bichat (1777-1802), who had died prematurely. Prévost in his enthusiasm overworked and succumbed to an attack of typhoid fever, which kept him from his work for several months. Thanks to the loving care of his family he recovered completely. True to the tradition of the medical students of Geneva, he continued his studies in Edinburgh in the year 1816, and was there promoted to the degree of M. D. on 1 August 1818. The subject of his dissertation on the use of baths in medical treatment shows that the practical aspects of medicine were predominant in the Scotland of that period. Prévost finished his surgical and gynaecological education in a hospital in Dublin. Owing to his healthy constitution he managed to survive the dysentery which he contracted while in Ireland, where it was widely prevalent at that time.

At the age of thirty he began to practise in his native town after having brilliantly passed his examination for admission. In the beginning, when his time and energies were not yet fully absorbed by his patients, he devoted some time to independent investigations, to which he had been drawn in connection with his studies in Paris. Especially the new chemistry and microscopy founded by Lavoisier and based on the new principles of the Italian physicist, Giovanni Battista Amici (1786-1863), gave promise of a wealth of discoveries. Prévost succeeded in obtaining the collaboration of a young pharmacy student, Jean-Baptiste Dumas (1800-1884), of whom more will be said later. Their collaboration was very gratifying. Together with this chemist who was to become famous later on, Prévost in the following four years published a series of epoch-making studies. However, the number of patients began to increase leaving Prévost little time for his private predilections. Nevertheless even after Dumas had left him in order to settle in Paris, he was able to pursue his experimental research side by side with his practice, thanks to the collaboration of two Geneva men, Augustin Le Royer (d. 1863) and A. Morin. He was also eminent as a practitioner. His exact

physiological thinking combined with a sure intuition made him a physician of renown. His charming personality,—an occasional absent-mindedness was readily forgiven—and the success of his therapy, especially in the case of scrophulosis and tuberculous complaints attracted many colleagues who liked to ask his advice in difficult cases. Early in his career he pressed for free treatment for the poor; and, together with his friend and later biographer Louis André Gosse (1791-1873) as well as Doctor Dupin, he founded the first polyclinics on the continent. He published little on his experiences as a medical practitioner: but in 1823 he described a method of dissolving vesical calculi by the galvanic current. When his practical work became so extensive that he had no more time to devote to his investigations and studies, he retired and gave medical advice in rare cases only.

Shortly before his sixtieth year Prévost began to suffer from a severe illness (apparently diabetes). Vascular troubles occurred more and more frequently. In spite of constant pain Prévost continued his studies of developmental history in conjunction with the well-known physiologist and pathologist Hermann Lebert (originally Lewy, 1813-1878), who in later years took charge of the clinic for internal complaints in Zurich. Prévost's death deprived Geneva of a very deserving man who had not yet reached the peak of his potentialities.

Before we begin to give an appreciation of Prévost's essential merits, we shall say a few words about Jean-Baptiste Dumas, his colleague and ten years his junior, for a large part of Prévost's research work is not to be thought of without Dumas. An excellent picture of his great personality has been left us by the German chemist August Hofmann (1818-1892), founder of the "Deutsche Chemische Gesellschaft," in one of the annual reports (Berichte) of the latter. This essay is informative on the subject of the period Dumas spent at Geneva and of great interest especially to chemists.

Dumas was born on 14 July 1800 in Alais (Dép. du Gard). Originally he was destined for marine service, but the immense changes brought about after the fall of Napoleon I, led his parents to direct this carefully educated young man towards a scientific career. He had started his pharmaceutical studies in his native

country, and he continued them in Geneva at the age of sixteen. In Augustin Le Royer, a pharmacist of whom nothing but the name is known to me, he found a teacher who encouraged scientific research. The Geneva atmosphere was the right place to foster the future leader of science and research. It was not long before he gave his first lectures in the large laboratory adjoining the chemist's shop. Family ties brought him into touch with important men like Candolle and de Saussure. Two minor discoveries in the field of chemistry brought him the friendship of the chemist, Gaspard de la Rive. Perhaps it was the latter who introduced him to Jean-François Coindet[2] (1774-1834), who was then looking for traces of iodine in sponges. Dumas made the necessary analyses and suggested the use of potassium iodide in therapy. Alexander von Humboldt induced him to move to Paris in 1823, which brought the fruitful collaboration with Prévost to an end.

His connections with Prévost, who had then returned from Paris, are of special interest to us. Hofmann's biographical sketch is of particular importance as it is based on his personal reminiscences of Dumas. The following statements may be drawn from this sketch of the common researches of the two men.

The search for the active principle of digitalis constituted the modest beginnings of this collaboration. Unabated by their failure in this, they decided to attempt nothing less than to include in their research the whole field of physiology, studying it on the basis of the newly established chemical and physical laws. They were under the influence of Bichat's principles of general histology. Although Bichat does not mention cells, his types of tissue, which are (like chemical substances) composed of single elements, formed the starting point for all the biological researches of the two young investigators at Geneva. They concentrated their first efforts on research into the elements of the body fluids. They were the first to examine the shaped particles in milk, blood and semen, which had been neglected before. Microscopic and chemical analysis provided them with the means of research. Prévost was the minutely observing morphologist, Dumas the scientific calculator.

[2] On J.-F. Coindet, see *Bibl. univ. de Genève*, vol. 55, 1834, p. 218-220.

These investigations begun with such great enthusiasm were outstanding. In many fields their work was fundamental for the further development of the 19th century. The hematology of today, the principle of transfusion and the knowledge of vegetative metabolism are not to be thought of without their preparatory work, which will be dealt with in another place.

Moreover the conditions at Geneva for experiments on animals were not in the least favorable. The still very influential clergy and the orthodox population looked upon the activity of the two enthusiastic scientists with diffidence. Hofmann gives us—what is probably first hand—news on their proceedings:[5]

> What precautions the two friends took in order to mislead the honest citizens of Geneva! The captain of police had given them permission to use one of the casemates in the fortifications, which had an entrance from the Bel Air promenade. In the small hours in the morning between 2 and 3 a. m. they used to walk down to this isolated part of the town armed with all the necessary instruments. They carried a lantern which gave them the appearance of a patrol, so that even when discovered, they did not excite the curiosity of a chance passer-by. The whining of the victim did not penetrate beyond the thick walls of the casemate. As soon as the operation was finished and the necessary dressing put on, the owner could take the poor animal home without further difficulty.

Now let us examine the work of Prévost and Dumas a little more in detail. It is only by setting the results of their investigations into their historical place that we can form a true estimation of their achievements.

The chronological order of their investigations determines the general order of their research. From the very beginning Prévost and Dumas had clearly traced the outlines of this work, as they did in every case. In their first treatise[6] on the theory of generation they proposed three leading principles:

1. The exact definition of the semen;
2. The exact definition of the ovum;
3. Exact investigations of the part played by the semen and the ovum in the act of fertilization.

[5] P. 641 *et seq.*

[6] "Nouvelle théorie de la génération," *Ann. Sc. nat.* (Sér. 1), vol. 1, 1824, p. 1-29, espec. p. 6 *et seq.*

Only facts were to be reported, and the results were to be classified with the data already known.

We have now to find on what foundations Prévost and Dumas based their work within the limits thus set, and then follow the course of their investigations.

The simplicity of microscopic and anatomical observation may have induced Prévost to examine the semen as well as the blood, and to make the male organs of reproduction of the most varied animals the object of his first investigations. He published at about the same time in two Genevan medical journals his treatises on the blood on the one hand,[5] and on the other hand his report " Sur les animalcules spermatiques de divers animaux." The fame of the comparative anatomy of George Cuvier (1769-1832) may have influenced the choice of the subject.

The spermatozoa were from those mysterious parts of the body which had led the naturalists of the romantic period to the boldest speculations. They had, therefore, become one of the most favoured objects of research at that time; and a sober man like Prévost must have wished to bring research in this field from the sphere of pure imagination back to real facts, back to the facts established by the discoverers of the spermatozoa, namely Johann Ham (1651?-1730?) and Anthony van Leeuwenhoek (1632-1723). Beginning in 1677 the latter, an amateur Dutch microscopist, had first of all tried to give a true and exact description of his observations. Later he was led by his contemporaries to embark on unfortunate speculations on the genetic importance of the spermatozoa, speculations which prevailed during the course of the following decades and led to strange abuse. This movement was well-known, especially at Basle, where several studies were published on this subject.[6]

Prévost and Dumas bring about a new period in the history of spermatozoic research. The two Genevan scientists were the first to investigate the problem of the origin of the spermatozoa by means of thorough examination. The problem had been attacked by Buffon

[5] Examen du sang et de son action dans les divers phénomènes de la vie (with Dumas). *Bibl. univ. de Genève*, vol. 17, 1821, p. 215-229, 294-317.

[6] By Wilh. His (1831-1904), and by Heinrich Buess and Charles A. Joël, see Sources.

(1707-1788), but his vitalistic conclusions were on the same plane as those of the Greek naturalists in the time of Plato. We shall here only deal with Prévost's and Dumas's physiological experiments, and not do more than mention their many studies on the morphology of the spermatozoa and the sexual organs of animals (e. g. rabbits, guinea pigs, hedgehogs, cats and dogs, birds and cold-blooded animals). The electric spark of the Leyden flask paralyzed the spermatozoa. Alkaline solutions were less destructive than acids. The most important results of their examination, however, were exclusively derived from the testicles and not from any other part of the male sexual organs.

The results were presented in a treatise published soon afterwards, which constituted the first part of the important work " Nouvelle théorie de la génération " (1824).[1] Endeavouring to free themselves from all shackles of previous hypotheses and to base their statements entirely on the results of experiment, they engaged in studies of comparative anatomy, and were able to demonstrate in the case of the polecat that " If the testicle is cut in slices taken either from the surface or central sections, from near the epidermis or from the opposite end, and the fluid is allowed to flow out and then examined under the microscope, small animalcules, one like the other, will be noticed in each case, and found to be identical with those examined earlier in the liquor seminis." This was the undeniable proof that the spermatozoa were the specific product of the testes. Experiments with other animals have rendered the same results. It was left to young Albert Koelliker (1817-1905) and to Adolf de la Valette-St. George (1831-1916), to furnish the histological evidence of the spermatozoa being derived from the cells of the testes. Prévost and Dumas were still of the opinion that " the spermatozoa had no intermediate state between their complete form and their non-existence."

For a time the two investigators studied genetics (in the case of the mule). They even ventured on single deductions with regard to the internal structure of the spermatozoa. When experimenting on a frog, they discovered through the microscope of Amici a light centre

[1] See Note 4.

the head of the spermatozoon. Their investigations of the other parts of the spermatozoon were equally in advance of their predecessors.

A characteristic of their "general results" is their very guarded wording with regard to the function of the spermatozoa. "They have," they wrote, "actually an important, perhaps an exclusive, part in the act of generation;" [8] they are lacking completely in sterile animals, e. g. the mule. The movements of the spermatozoa depend also on the physiological state of the individual and, "judging from all our experiments, they must be the outcome of a real secretion."

The two men do not explain, however, what they imagine this "secretion" to be like. Here too, they remain faithful to their principle of laying down as few theories as possible. Although they may have exaggerated in this respect, it must be admitted that the facts could only be followed up later by cytology and improved microscopic methods. In any case, Prévost and Dumas were the first to examine scientifically the question of the origin of the spermatozoa, and the first to presume a mechanism of formation which could be understood by their contemporaries.

According to their plan the biologists then proceeded to the following problem: What is the influence exerted on the ovum by the spermatozoa? Those keen scientists had set themselves no less a task than to divest the process of fertilization of its mystery.

The question of the part played by the male and female procreators had always interested the embryologists. According to the followers of Hippocrates, the male and female seed mingled in the hollow of the uterus, and no special importance was attributed to either of the parts. For Aristotle with his dynamic way of thinking matters were different. According to him it was the part of the female to furnish the material substance (in the form of the catamenia), whereas the "substrate" of the male seed caused motion and formation. Embryologists until after the Renaissance, accepted either one or the other of these theories. In the late sixteenth century Fabricius of Aquapendente (1537-1619), the greatest authority in this field, added his theory of the "aura seminalis," which he thought en-

[8] *Ann. Sc. nat.*, 1, 1824, p. 285 *et seq.*

abled the action from a distance of the seed on the ovum. Harvey, the vitalist (1578-1657), believed the " agens " (agent) of fertilization to be a sort of " Contagium " causing a fermentation in the elements of the female formative substance (the ovum). The fertilization itself, however, he took to be an immaterial process corresponding to the " conception " of thoughts in the brain.

Until the eighteenth century the " aura seminalis " haunted many minds. At first the systematic studies of fertilization by the Italian priest, Lazzaro Spallanzani (1729-1799), put an end to these chimeras. As W. H. Schopfer [9] has again pointed out recently, it was Spallanzani who introduced the frog into biology as an object for experiments, and who proved that the contact of ovum and sperm was necessary for fertilization. His numerous studies, in which he examined the relations between the sperm and the ovum, brought him however to the erroneous conclusion that the spermatozoa had no part in fertilization. He too, in a certain degree, still believed in an immaterial and mental influence of the sperm, i. e. in the theory held by Aristotle and Harvey. His well-known experiments, which made him the father of experimental research in fertilization, were progressive, but his deductions retrograde.

Up to the end of the eighteenth century, only very few scientists had investigated the first stages of the development of the ovum. The famous Dutch microscopist, Jan Swammerdam (1637-1680), for instance, described the first segmentation of the fertilized ovum of the frog. No other statements on this subject have been recorded, although it must be presumed that other biologists made the same observations. Nor is Swammerdam's discovery of much importance, as it was only a secondary result of his investigation and of no further consequence. The attitude of the Dutch physician towards his divided frog's ovum is rather that of awkwardness, especially as every connection with the act of fertilization and every association between the segmentation of the ovum and the spermatozoa are lacking. Spallanzani as well was a firm believer in the theory of preformed organs. As according to this doctrine the embryo is preformed in the ovum and the sperm only causes its development,

[9] Schopfer, *l. c.*, p. 94-96; see also Buess and Joël, (*l. c.*) p. 79.

there was no room in his system for the idea that the individual form was built up from an amorphous substance. He even called the amphibian egg a larva.

Spallanzani's experiments were known to Prévost and Dumas. Their own investigations are recorded in the second part of their treatise "The new theory of generation." [10] They may be divided into two definite parts. It would have been better, had they taken the second part first. Instead of describing the importance to fertilization of the spermatozoa, they first note the immediate consequences, and in the end only examine the physiological relations between the spermatozoa and the egg.

The two Genevans, like Spallanzani, experimented on the frog's eggs. After having described the female sexual organs of the frog and the act of mating, they relate their parallel running experiments. Unfertilized and fertilized ova are put into water. Whereas the former swell owing to the absorption of water by the mucous envelope, the latter show a series of changes which Prévost and Dumas examined with the greatest excitement. A magnifying glass and a strong light made the exact investigation possible. Day and night they were captivated by the truly exciting things that happened. Their description, which for the first time records the earliest transformations in the course of individual existence, reads like a novel. The egg, as long as it is in the ovary, contains a brown zone within which a circular yellow spot can be seen. This again surrounds a smaller circular outline, to which Prévost and Dumas gave the name, which it still bears, of "cicatricula." Within this central section the later development of the fetus takes place.

Let us now follow the further proceedings together with the two scientists! I quote their own words: [11]

> Comparing carefully the ova in ordinary water with those which had been brought into contact with the fluid pressed out of the testicles, we did not at first notice any difference. But after about three quarters of an hour or one hour, the latter began to be distinguishable by a small groove, beginning at the cicatricula or near it, and extending towards the vault of the brown hemisphere like the radius of a circle, which starts from the centre and

[10] *Ann. Sc. nat.*, 2, 1824, p. 100-121, 129-149.
[11] *L. c.*, p. 110 *et seq.*

reaches the circumference. This groove was of a brown colour and looked like a line drawn by a compass. It had hardly been formed, when it extended toward the opposite side as well, and, within a few minutes had cut the hemisphere in two. Shortly afterwards it grew towards both ends and got to the lower, yellow part of the ovum, where it stopped. This groove then deepened more and more. First it looked like a slight depression, but then furrowed deeper with incredible speed . . . and soon the ovum was parted in two clearly defined segments. [Later on Prévost continues:] Then another line formed which cut the egg all around like a sort of equator, but this new arrangement did not last any longer than the others, and it had hardly begun, when new things happened all around.

The quartered ovum then was a transitory stage. New fissures parallel to the first went on dividing the brown and the yellow globes into parts, until there were sixteen. Then the so called "granulations," as Prévost named them, were formed and made it look like a "raspberry." Nothing regular could have been seen in it, unless they had watched the details of its development. Thus the investigators report. About two hours later these 30 or 40 particles developed into nearly double the number. Seven hours later after the fertilization that took place at 2 p. m. all these single proceedings had been terminated in exactly the same way without any interruption being noticed. Every two hours Prévost and Dumas made notes. The note of 6 a. m. the following morning, i. e. sixteen hours after the fertilization, is of interest. The ovum to the naked eye had again taken on a uniform appearance. "Through the magnifying glass, however, it could be noticed, that it was marked by a lot of small black dots . . . , which disappeared in their turn in the course of the further development."

Prévost and Dumas wondered what could be the cause of these strange proceedings? They knew that anything they could surmise was mere speculation, but they had to admit that the influence exerted by the fertilizing liquid was most astonishing, if after the first contact it extended effectually over the whole of the egg. They were fully aware of the importance of their experiment, as is seen from the following quotation.[12] "This part of the history of fertilization is entirely new. We therefore hope that such experiments will be made

[12] *L. c.*, p. 113.

on other classes of animals and thereby help to establish a general rule which will better satisfy the human mind."

There followed a stationary phase of about twelve hours, after which they proceeded to describe the further development. As this part of the record hardly describes anything that was not known through earlier investigations, we shall not discuss it any further. A short recapitulation of the above is more to the point.

Starting from occasional fragmentary notes by former scientists on the earliest transformations of the fertilized frog's egg (they had been made without connecting this process with the influence of the spermatozoa), Prévost and Dumas, fully aware of the importance of their investigations, described the various stages in the segmentation of the ovum. They replaced the fragmentary earlier statements on the first phases of development by the exact investigation of the successive transformations of the ovum. They called this primal development of the ovum " segmentation," as we have done ever since. The segmented ovum in the mulberry stage they called raspberry, a term identical with the " morula " (mulberry) of modern medical terminology. The black spots seen through the magnifying glass were presumably the nuclei of the cells. What is however most important is the logical deduction, which Prévost and Dumas made, that these processes were the result of the action of the sperm on the egg.

For a good reason the two scientists from Geneva are, therefore, called the real discoverers of the egg segmentation. Their discovery marks a turning-point in the history of embryology, inasmuch as it elucidated individual development as far back as the very first changes taking place after fertilization, and from then onwards in uninterrupted unfoldment. Its real importance, however, could not be realized before the development of the new science of cytology. This made it clear that the individual originated from one cell, which through the process of ever-increasing segmentation turned into a solid mass of many cells. The Zurich histologist, Albert Koelliker (1831-1905), contributed not a little to the establishment of this principle. In 1930 W. von Buddenbrock, the Kiel zoologist, did not give Prévost's work the credit it deserved. His judgment is based on second-hand knowledge, and he is definitely wrong in claiming Karl

von Baer as the first to have discovered the segmentations of the ovum. For, as we can see from the passage quoted above, the Genevan investigators were fully aware of the complete cleavage of the ovum, through the first folds, as well as the subsequent two, four, eight, sixteen, and thirty-two segments. In order to give a sound account of the merits, Buddenbrock ought at least to have read Prévost's work, which he evidently had not. It is of course true that the experiments made at Geneva cannot compare with those of later investigators. Buddenbrock might even have mentioned before Baer Mauro Rusconi (1776-1849)[18] and his treatise on the "Développement de la grenouille commune" (Milan 1826), which for that time is excellently illustrated. The lack of illustrations is a great disadvantage in the work of Prévost and Dumas. The captions for their illustrations are indeed extant; but no plates can be found, which seems to point to a mistake or accident on the part of the publisher or the bookbinder.

In the further course of their research Prévost and Dumas proved that there was a close connection between the number of fertilizing spermatozoa and the number of developing ova. Each contact of the spermatozoon with an ovum corresponds to a developing fetus. The investigators had arrived at this conviction on the basis of numerous experiments with animal sperm. These experiments were based on the supposition that the spermatozoa are of vital importance to fertilization. At the same time Prévost and Dumas proved that the number of spermatozoa available in the act of fertilization was much larger than that of fertilized ova. They constructed a special "counting chamber," by means of which they counted 225 spermatozoa to 61 fertilized ova.

In the case of the salamander, of which they treat in the same essay, Prévost and Dumas pointed out that it was their active movement which allowed the spermatozoa to penetrate the mucous envelope of the ovum. In every single case they were even found in contact with the membrane of the ovum. If investigations had been pursued along this line, the process of the act of fertilization in animals would have been discovered earlier than they actually were.

[18] For Mauro Rusconi see *Enciclopedia italiana* (*l. c.*) and Cattaneo (*l. c.*).

The contemporaries of Prévost and Dumas fully realized the importance of the research carried on at Geneva. This acknowledgment was expressed in the form of the Monthyon Prize, established not long before, and the Golden Medal of the Institute of France, which were awarded them for their study.

At the end of his essay, Prévost even ventured to propound a "theory of fertilization." It is the spermatozoon, he suggested, and not the sperm as a whole, that is the "agens individualis" (individual agent) in fertilization. The "cicatricula" is the "agens générateur" for the ovum, in which, after fertilization, a central line recalls the passage of the spermatozoon, and later becomes the axis of the growing organism. There can, however, be no question of a preformation of the subsequent members inside the ovum. Prévost was decidedly opposed to the theory of encasement, of which his compatriot Charles Bonnet (1720-1793) was a fervent adherent, though he still tended to see a preliminary stage of the ultimate fetus in the spermatozoon itself. He cannot deny certain animalculist endeavours; but his prevailing tendencies are in line with Buffon and Wolff.

Before we turn to subsequent experimental research on the subject of fertilization, we have to glance at the third part of the treatise frequently quoted.[14] In their investigation of cold-blooded animals Prévost and Dumas had already noticed that the ova as well as the spermatozoa kept their fertilizing qualities for twenty or thirty hours. Experiments in filtration of the sperm had proved that after five repeated filtrations the filtered substance had lost all fertilizing power, but not the residue. This proved once and for all the fundamental importance of the spermatozoa in the act of generation.

The next step was to prove on a higher class of animals the same laws which they had demonstrated on amphibians. The two men were well aware of the difficulties of this undertaking, but were not to be deterred. Studying the third part of their treatise with its apparently simple and natural conclusions, it is scarcely possible to realize the innumerable experiments that must have preceded the establishment of the facts.

[14] *Ann. Sc. nat.*, 3, 1824, p. 113-138.

The last joint investigations by Prévost and Dumas were carried out on rabbits and dogs. Here they were following in the wake of Regner de Graaf (1641-1673). Once again it was a Dutchman that gave Prévost the lead in his research work. First it had been Leeuwenhoek and Swammerdam: now it was de Graaf with his *De mulierum organis generationi inservientibus* (Leyden 1672). This Delft anatomist had not only described the follicles of the ovary which now bear his name; he had also explained in the case of the rabbit the mechanism of ovulation and of the migration of the ovum. Although de Graaf had not seen the ovum in the follicle, his anatomical studies had convinced him that it must be contained in the ovarian gland and be discharged when the follicle bursts, for the ova found in the uterus after mating were still smaller than the follicle, although they must have grown since their fertilization.

Later investigators did not get further than de Graaf's statements. Haller's view, as stated in his *Elementa physiologiæ*,[15] that the follicle discharged a liquid into the tubae, was later generally adopted owing to his great authority in other branches of science. Like de Graaf, the English anatomist, William Cruikshank (1745-1800), had not actually seen the ovum when opening a follicle. It is at any rate very unlikely that he had.[16]

Prévost and Dumas tried to fill the gap in de Graaf's investigations as to the relations in time and space between ovulation and fertilization. After the mating of dogs and rabbits they made successive examinations of their respective ovarian follicles and the spermatozoa. The times stated by them seem absolutely reliable. At each subsequent investigation of the dissected animal they carefully examined the size and state of the ovary on the one hand, and the presence of spermatozoa in the various sections of the female genital tract on the other hand. The vesicles, they found, grew for six days after mating: then they suddenly vanished and were replaced by yellow corpuscles, whereas in the membrane of the follicle the place of bloody rupture could be seen at the time. The cicatrization and the transition into the corpus luteum are also described. After many vain ex-

[15] *El physiol.*, VIII (1766), p. 44 *et seq.*

[16] According to the statements of Valentin. Researches of my own I did not make. (Orig.: *Reils Arch.*, vol. 3, p. 74-94.)

periments Prévost and Dumas at last succeeded in finding on the eighth day the vesicles (six in all) in the uterus horn. The number of yellow corpuscles corresponded to the number of vesicles; and in these the two immediately recognized the fertilized ova.

This corroborated de Graaf's statement and settled the old controversy. It is not the follicle itself, but a small part of its solid contents, which reaches the uterus through the Fallopian tubes. These "vesicles" measure from 1½-2 mm. in diameter. They can only be seen if the uterus horn is opened with the utmost care and scrutinized minutely. They can be removed and laid in water. They are not parts of the mucous membrane, which itself often shows vesicular formations. When magnified thirty-fold, the ova appear as elliptical corpuscles, transparent, and evidently held together by a strong covering membrane. At the top—I still follow the description of the two authors—there is a "fibrous small cap" of closer texture than the rest.

Prévost and Dumas go on to describe briefly the further development of these corpuscles.

On the twelfth day the first organs of the embryo could be seen in the shape of a black longitudinal line, in which the investigators thought they had discovered the spinal marrow of the fetus.

We are more interested in this connection in the investigation of the spermatozoa. Twenty-four hours after mating they could be seen in the uterus horns. On the third or fourth day one or the other might be seen in the tubae. Wherever they were they kept in constant movement. In the ovary no spermatozoa, however, were traceable. This led the investigators to the conclusion that fertilization probably took place in the uterus horns or in the tube, but not in the ovary, as many early investigators had believed.

The results of the investigations of Prévost and Dumas had made it clear that in the case of mammals fertilization does not coincide in time with the moment of mating. Fertilization occurs several days later, when the spermatozoa come into contact with the ovum.

The most important results however are to be found among the conclusions at the end of the treatise. In point four Prévost and Dumas maintain that the vesicles and the ovules must not be confounded with one another. They proceed as follows: ". . . probably

those ova or vesicles of the ovary contain the small ovula of the horns. These ovula are there enveloped by a liquid which has to facilitate their transport to the uterus. Several times on opening such a vesicle in an advanced stage we found inside it a small spherical body of 1 mm. diameter. It was, however, different from the ovula which we had noticed in the horns, as it was more opaque. It would therefore be necessary to investigate thoroughly the relation between the vesicles of the ovary and the ovula in the horns." This quotation is found on page 135 of the above-mentioned essay.

A certain terminological awkwardness may be noted in this work. The authors sought somewhat unskilfully to overcome this defect, e. g. by proposing the word " vesicula " for " the encasements of the ovary," by which they probably meant the ovum. But the greatness of their achievement remains unaffected, and must not be underrated.

Prévost and Dumas by their exact investigation of the uterus horn proved that it is the ovum, presumed to be in the ovarian follicle, which is fertilized in the upper parts of the female genital tract and which then develops in the uterus.

In my opinion the above quoted passage also proves that in the course of their investigations they saw the ovarian ovum as well. I believe the " spherical corpuscle " seen inside the follicle may be assumed to have been the ovum. Should this supposition be right—and except for the dimensions nothing speaks against it—it will result that it was not Karl Ernst von Baer in 1827, but Jean-Louis Prévost and Jean-Baptiste Dumas in Geneva as early as 1824, who were the first to describe the unfertilized mammal's ovum.

It is therefore all the more astonishing that, so far as is known to me, recent literature on the history of biology has not pointed this out. The only work to refer to it seems to be that of the young physiologist, Gabriel Gustave Valentin (1810-1883). In his *Handbuch der Entwicklungsgeschichte des Menschen*[17] he cites in the original French text the passage quoted by me in translation. Valentin also puts Baer's merit in its proper place—that is to say, as the outcome of the preparatory work done by de Graaf and Prévost.

Baer was in advance of the Geneva scientists in so far as he drew

[17] *L. c.*, p. 12.

the correct conclusion from his observations. He knew he had found the long looked for ovum, which had already been postulated by Harvey. The German scientist realized the full import of his results, whereas the Geneva authors were still bound by the shackles of outworn conceptions. Although they maintained that there could be no question of a female semen, they did not dare to draw a positive conclusion from their scientific research. Here, as in their study on the formation of the spermatozoa, they expressed themselves very guardedly. Prévost lacked the boldness of thought with which to incorporate his results into the general correlation of facts. He kept too closely to his laboratory experiments, and was too modest to venture to derive any theory from them. He is certainly not open to the reproach of laziness of thought: but in the presence of the flood of theories, which for scores of years had made developmental history the playground of the most extravagant speculations, his reserve was decidedly exaggerated. This is probably the reason why today his achievements are so little known. It seems to be necessary that they should find the place which they deserve in the Swiss history of biology.

The lack of pictorial material is a great disadvantage, especially in the last part of the treatise. Suitable illustrations would greatly facilitate the appreciation of its contents by the historian. Here too the omission seems to have been due to the publisher, as the captions to three plates are extant. The "spherical corpuscle" inside the follicle however is not among them.

Did the two scientists themselves fully realize the importance of their achievements? Yes, in so far as their discovery of the segmentation of the ovum and early embryonic development are concerned, but hardly in regard to the importance of their contribution to the theory of fertilization. And yet one glance at the further development of experimental research on fertilization [18] clearly reveals the merit of the Geneva biologists in this connection as well.

The results obtained by Armand de Quatrefages [19] in 1848 did not bring anything to light which Prévost and Dumas had not already discovered in their developmental history.

[18] Cf. my essay in *Gesnerus*, *l. c.* (1945).
[19] s. Sources.

The scientists of the ' fifties of the nineteenth century were faced with the theory of fertilization " Kontakttheorie " of the Giessen embryologist, T. L. W. Bischoff (1807-1887).[20] Basing his theory on the publications on fermentation of the chemist Justus Liebig, he believed the essence of fertilization to be a " communicated molecular movement " caused by the contact of the ovum with the spermatozoon. It is Nikolaus Alexander Warneck of St. Petersburg, who started a new period with his isolated observation.[21] For he had traced two nuclei inside the freshly fertilized ova. This research might have led into the right path, had his work been given more credit. His explanation of how the spermatozoon penetrated into the ovum was less fortunate. Only Newport's [22] experiments on amphibians, showing the disappearance of the spermatozoon in the yolk of the egg, carried conviction in this field.

The discovery in 1851 of the micropyle (the opening through which the spermatozoon enters the ovum) in the animal ovum by the well-known biologist Johannes Müller (1801-1858)[23] gave a new impulse to the orientation of the important problem of the mechanism by which the entrance of the spermatozoon into the ovum is controlled.

Others (Keber 1853, Leuckart 1853, Meissner 1855, Ranson 1855)[24] soon reported similar observations. After many unsuccessful experiments by other scientists (among them Vaucher of Geneva), Nathanael Pringsheim (1823-1894) succeeded at last in demonstrating the actual process of fertilization in algae. But when the zoologists began to make similar experiments (Meissner 1855 et seq., Lacaze-Duthiers 1857, Robin 1862),[24] they were all unsuccessful. The resigned attitude of Edouard Claparède (1832-1871) towards the new experiments is understandable, for what these men had believed to be spermatozoa in the interior of the ovum, were invari-

[20] The retrospective essay mentioned in the Bibliography (1877) was the only source placed to my disposal.

[21] Biographical dates I could not find.

[22] Newport's essay from the year 1851 is without any importance in our connection.

[23] Besides the information from the year 1851 (*Monatsber. Akad. Berlin*) the two essays published later and more complete of the year 1852 and 1854 (s. Sources) must be mentioned. (1852, s. Table IX, fig. 8 and 9.)

[24] For bibliography see my former essay (1945).

ably some other corpuscles. Nor does Oskar Hertwig [28] refrain from criticizing these " observations."

Some German scientists were soon to bring more light into this obscure matter. Foremost among them is the zoologist, Otto Bütschli (1848-1920), who not only demonstrated the mechanism of cell division, but was also the first to describe the union of the two nuclei inside the fertilized ovum. Eduard Strasburger (1844-1912) made similar observations on plants. Otto Bütschli, Leopold Auerbach (1828-1897), as well as some other cytologists, were however still of the opinion that in the union of the two sexual products the substance of the spermatozoon was dissolved and amalgamated with the substance of the ovum.

It was Oskar Hertwig (1849-1922) who, when still a young scientist, gave the study of fertilization its modern turn. The chief subject of his thesis of habilitation (1876) was the investigation of the function of the nuclei in the act of fertilization. He also demonstrated the different sex of the nuclei in the ovum-cell and the spermatozoon-cell respectively. For the first time the sea-hedgehog was made the object of examination, This was of paramount importance to the further development of genetics.

Hermann Fol, a Geneva physician (1845-1892), studied the same animal. Like Hertwig he returned again and again to the shores of the Mediterranean in order to continue the investigations of the Mediterranean sea fauna which Albert Koelliker, Heinrich Müller, Karl Vogt and others had begun. We shall here only refer to his contribution to the history of spermatology. There has been some doubt as to Fol's merits in this field. I think it therefore pertinent to refer to Hertwig, who is the most competent specialist. In his " Dokumente zur Geschichte der Zeugungslehre " (1918) he gives a convincing estimate of Fol's discovery.

Even in 1872, Wilhelm Wundt (1832-1920), a physiologist who practised at Heidelberg, wrote in his " Manual of the physiology of man " that the essential condition of fertilization was " most probably " the penetration of the spermatozoon into the substance of the ovum. Hertwig himself had left a gap in the chain of his demon-

[28] 1876, p. 390-398.

strations. When investigating the ovum of the sea-hedgehog, he had not been able to see the actual entrance of the spermatozoon into the ovum. In his publication [26] he says himself that the gap must be removed in order to attain "the full degree of certainty which natural science requires." A little further on he says that in 1876 he had made the acquaintance of Fol who, bent on the same purpose as himself, had arrived at Messina with his family. According to Hertwig, they had not met often, and their parallel research work was done independently of each other.

He is, however, wrong in stating that Fol did not publish his work before 1879, for the first record by the Geneva scientist appeared in the *Archives des sciences physiques* of the year 1877. It was called "Sur le commencement de l'hénogénie chez divers animaux." Here Fol describes his experiments on the ovum of the sea-hedgehog. The numerous illustrations added to his report are of great documentary value. Fol begins by giving full credit to Hertwig's work, and then goes on to describe the penetration of the spermatozoon into the ovum: [27]

> The first of the spermatozoa, which contacts the mucous cover of the yolk, gets fixed there immediately. One or two seconds later it comes in contact with the yolk itself. The flagellation of the tail abates, the spermatozoon becomes elongated, and enters the yolk. For some moments the tail remains visible, then it disappears, leaving in its place a transparent cone. This cone becomes longer, changing its shape continually. Having taken on many different forms, it finally vanishes after a few minutes. . . . The point of contact is not determined by the position of the female pronucleus. . . . As soon as the contact between the spermatozoon and the yolk has taken place, a thin membrane detaches itself from the latter, and rises to the place of contact.

The three above-mentioned passages clearly define first, the penetration of the spermatozoon and, secondly, the rising of the amniotic membrane, i. e. the most important processes in the union of the sexual cells. The rising amniotic membrane, as Fol says, prevents any further male elements from entering the yolk. If the ovum is treated with pure alcohol, with osmium tetroxide and potassium

[26] 1918, p. 39.
[27] 1877, p. 456 *et seq.*

chromate, the union of the two nuclei in the ovum can be distinctly seen in the way described above. The third phenomenon illustrated by the above passage and observed for the very first time is the formation of the "attraction cone." At the approach of the spermatozoa, an accumulation of protoplasm forms opposite the foremost and quickest spermatozoon. It grows into a cone, from the end of which a small thread reaches out towards the head of the spermatozoon, which then enters into the yolk, leaving a pale cone visible for some time in the mucous cover.

Hertwig refers to these passages of Fol's, when he says: "Priority is due to Fol for having made exact scientific studies of the penetration of the spermatozoon into the ovum, and for having demonstrated the formation of the attraction cone and the rising of the Membrana vitellina." This definitely settles the question, into which Prévost and Dumas had inquired before him, as to whether a penetration of the spermatozoon into the ovum really takes place. Once again it was a Geneva physician who settled a dispute which had lasted for scores of years, the dispute as to the where and the how of fertilization.

The uninitiated can hardly imagine what pains this discovery had cost. Fol gives us some small idea of it when he writes in a later publication: "The difficulty I had to overcome, in order to be able to examine the union of the spermatozoon with the ovum in natural conditions under the microscope, were so enormous that I only succeeded after months of vain trials." [28]

For the microscopic examination of the process of fertilization, Fol used a method with which Newport had worked before him. It consisted of a sort of observation cell which like the modern slide with a central depression, allowed him to bring together the ova and the sperm in drops of sea water. The cellular development was comparatively easy to watch in the transparent ova of the dioecious animals. They were easily procured and the sperm too. What presented the greatest difficulty to Fol was the speed with which the process of fertilization took place.

When the spermatozoon had penetrated into the ovum, Fol was

[28] Quoted according to Hertwig (1918, p. 40). At the present time Fol's treatise from the year 1879, where this remark is to be found, is not at my disposal.

able by means of certain reagents (acetic acid, osmium tetroxide, Beale's carmine) to see a distinctly radiated figure, which formed around the male nucleus. The carmine-tinted nuclear corpuscle showed the same condition as the heads of the spermatozoa outside the ovum. This went to prove that the corpuscle seen inside the ovum corresponded to the nucleus of the male spermatozoon. If the microscope preparation was fresh, even the flagellum could be traced. There was therefore no doubt left as to origin of this new corpuscule. The missing link of Hertwig had been found.

From the beginning of his embryological studies, Fol laid great stress on the protoplasmic radiations in the ovum, which he had been the first to trace. Hertwig on the other hand, on the basis of the results of later research (Koelliker, Schweigger-Seidel, LaValette-St. George [29]), laid stress on the nucleus of the spermatozoon-head, which originates in the spermatogones. Fol, however, as it is seen from his last important treatise of the year 1879, was of the opinion that the male nucleus (named from van Beneden), as well as the female pronucleus, were formed by the assimilation of yolk plasm. Starting from the same reflections, he centered his theory of fertilization on the protoplasmatic radiations which are produced in connection with the union of the nuclei. We know today that Fol was mistaken in this for, as Hertwig rightly pointed out, the union of the nuclei constitutes the main process of fertilization.

Nevertheless, Fol's last great study, in which he presents the results of his research on the broadest basis, must be considered a classical work. It is illustrated by many excellent plates. Up to this day some manuals of embryology contain some of Fol's illustrations on the process of fertilization. Finally we may quote a passage from Hertwig,[30] in which he gives an estimate of Fol's masterpiece: " Owing to its exact observations and the many excellent figures presented on ten plates, this work, which comprehends many sections of the animal world, ranks beside those of Strasburger (1875) and Bütschli (1876), which were published a few years earlier."

Fol, like Prévost, died all too soon. They both sacrificed their health and their life in the service of biological research. Jean-

[29] Cf. my publication with Joël of 1942, p. 87-91.
[30] 1918, p. 29.

Baptiste Dumas, in a lecture to French naturalists given in 1876, when he was an old man, well described the spirit of those two men, his former collaborator Prévost, and Fol, when he said:

Allow me to mention to you a fact which I have gathered from experience. In the course of my long career I have met people of very different character. If I look among them for one who was truly happy, I do not find him among the high-placed and influential, nor among the rich, . . ., but among the men of science who have been prepared to stake their lives in order to penetrate into the mysteries of nature and to discover new facts. In Laplace who for half a century searched for the laws regulating the universe, in Cuvier, the father of comparative anatomy, who resuscitated the picture of primitive man, in Candolle, who described all known plants and laid the basis of modern botany, in Brongniart who classified the different strata of the ground according to the fossils found in them. These great scientists and others like them, whose names are in everybody's mouth, have known a truly happy life. Inspired by the love of truth, indifferent to the enticements of any riches, they found their reward in the respect of their fellow-men.

ACKNOWLEDGEMENT

I am indebted to the editorial staff of *Ciba Zeitschrift* for the English translation of this paper.

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A VERIFICATION OF A HITHERTO UNKNOWN PRESCRIPTION OF THE 16TH CENTURY

L. C. STRONG AND E. L. McCAWLEY

Recently portions of the Voynich Manuscript have been deciphered [11] (see Appendix). According to the deciphered data this manuscript, coded in a double reverse system of arithmetic progressions of a multiple alphabet, was written by Anthony Askham (or Ascham) during the first half of the 16th century. The portions of the manuscript which are available have been decoded and are concerned, in part, with the use of plants on physiological processes in health and diseases of women.

In folio 93 of the manuscript a preparation intended as a contraceptive is mentioned. It contained oil of spindle, honey and pitch.* With the current vogue of discovery of antibiotics in plants (anemonin) as well as molds (penicillin), actinomycetes (streptomycin) and bacteria (tyrothricin) it was natural to assume that the contraceptic action was due to an antibiotic. The original meaning of an antibiotic would be any agent detrimental to any form of life.

Pitch, the exudate from the cut bark of pine trees consists of terpenes and their oxidation products—high polymer acids (colophony). Honey (mel) consists largely of polysaccharides. Neither of these classes of organic compounds has any appreciable action on the growth of microorganisms. If an antibiotic were to be found, study of the remaining component of the prescription, spindle or *Euonymus europaeus*, was indicated.

Euonymus has been mentioned in early medical writings, the Pen Ts'ao (Fu Fang T'eng) and Rig Veda. Theophrastus,[12] states that both the fruit and leaves are fatal to sheep and goats and that they produce purging and catharsis. In his *Natural History*, Pliny (Holland's translation, 1601) records " The smell and tast thereof is

* The original quotation in Medieval English is as follows: " I up a bol koten wet with oil spindl, compound honei, a pine recin spagges gains piler ose firm, err—stirt. Wanne orgie ebb, so koten bee remov'd."

pestiferous and menaceth present death . . . deadly to all creatures that eat them." [9] . . . (an agent which could kill all life would be an antibiotic indeed!).

Even more direct support for the suggestion of an antibiotic in *Euonymus* appeared in an article by Riederer [10] in 1833. He mentioned the fact that the common folk of southern Germany, Tyrol and Switzerland press an oil from ripe spindle seeds and use it as an agent against vermin in the hair of men and animals and at times against sores and wounds.

A few additional pharmacological observations on *Euonymus* are in the literature. Gerarde's *Herball* [3] written during the latter half of the 16th century states that if the " fruits be given to a man they purge both by vomit and stoole." Von Grundner [4] found the only constant action of a fresh hydro-alcoholic extract of spindle to be diuresis; it was effective in curing female hydrops, ascites and anasarca. The purgative and diuretic actions of *Euonymus* were used by the American Indians under " wahoo." In India, *Euonymus* is prescribed for torpid livers with flatulence and indigestion . . . stimulating the liver and thus increasing the secretion of bile.[2]

We could not find in our search of the literature, any reference to the contraceptic action of spindle. Nor does Askham, in his *Litle Herball* of 1550 [1] mention any drug or principle that may be construed as effective as a contraceptive.

Experimental

A source of spindle grown in Connecticut (*Euonymus Japonica*) was used for testing. This course seemed justified since it has been stated that " the properties of the two or more species used in medicine probably are similar if not identical." [13] The leaves, stem bark, root and fruit were ground separately with sand in a glass mortar with twice their weight of distilled water. In addition, a chloroform extract of the fruit yielded an ivory colored waxy oil with a vegetative odor.

The aqueous extracts were filtered through cloth and finally through filter paper. Aliquots of the four aqueous extracts and an aqueous suspension of the spindle oil (chloroform extract) were used in the Oxford cylinder plate technique for measuring bacteriostatic

activity. Agar plates inoculated both with Gram positive (Staphylococcus aureus) and Gram negative (Escherichia coli) bacteria were used. None of the extracts inhibited the growth of either Staph. or E. coli. In fact, the extracts appeared to be contaminated with chromogenic bacteria. The extracts were then filtered through a Chamberlain bacterial filter. Following removal of the contaminant organisms, the extracts were again tested for antibacterial activity and again there was no inhibition of growth.

Examination of the macerated portions of the leaves, stem bark, root bark and fruit after weeks of standing in water, indicated that they possessed no action in inhibiting the growth of molds. The percolates were heavily matted with the growth of the various *Penicillia* and *Aspergilli*.

The failure to find an antibiotic in any of the extracts prompted a review of the facts presented in the Voynich manuscript. It is at once obvious that a contraceptive is not necessarily an antibiotic.

Finally the extracts were tested with semen, something that should have been done in the first place. On gross observation all extracts of *Euonymus* coagulated the protein of the semen; under the microscope it was seen that the extracts soon caused the spermatazoa to lose motility.

In attempting to describe the mechanism of activity of spindle as a contraceptive it was recalled that many modern contraceptive jellies depend for their action on the presence of acid. When the various extracts of the *Euonymus* plant were tested against indicators all were found to be quite acid (pH 2).

A portion of each extract was then neutralized to pH 7 with NaOH. When neutralized, all extracts failed to coagulate the protein of semen and did not depress motility of sperm. Moreover, the original extracts coagulated fresh egg white protein but did not do so when the extracts were neutralized.

Chemical examination of spindle has revealed the presence of many organic acids, citric, tannic, tartaric and malic; and in the oil of spindle, benzoic and acetic acids.[4, 15] These acids probably account for the contraceptic action of spindle which as far as is known was first introduced by Askham and recorded in cipher in the Voynich manuscript.

Discussion

It will be recalled that during the 16th century plants were still the chief source of medicinal remedies. All prescriptions so far decoded from the Voynich Manuscript refer to the use of plant remedies with the single exception of the mineral substance alum. Here is an illustrative excerpt also decoded from folio 93:

Haawe-tre aple etten vnlich arums can drave wicks air fram spleen: like sisle he dris gas aut ovari. Ovaral seede dri real. . . . Pithie Plini sumac swuag hwit. Big prunes es rues reliv the whites. Ores drunk can ease thi pain from astral flux's. Ocra soup can I depend on fore over flux. Too urs (worse) lus flo, alum en oaten wha ease tot'l. Trew papa'n holde esence stirt en te mense arli-.*

We suggest that Askham drew upon the local remedies of the time and that he was also well acquainted with the classical writers. It would be logical, we believe, for Askham to substitute well esteemed plant herbs for the difficult to get dragon's blood and the disgusting ox gall. The use of pitch (spagas) and honey may well have been suggested to Askham by his reading Pliny.

In his *Natural History*, Pliny states:

Morever this is a thing for certain knowne, that there is nothing bringeth a women sooner to barrennesse, than hard travaile in child bearing. But to prevent this inconvenience, Olympias the expert midwife of Thebes, affirmeth, that there is nothing better than to annoint the naturall parts of a woman with ox gall, incorporat in the fat of serpents, verdegrece and hony mixed therewith before that she medleth with a man in the act of generation.[9]

Pliny also states that pitch "The very odor or perfume thereof, helpeth the hardnesse of the matrice (uterus); and setleth it againe, being either falne downe, or turned out of the due place."[9] Accord-

*Our preliminary interpretation is: The apple of the Hawthorn (*Crataegus Oxycantha*) when eaten, unlike the wake robin (*Arius vulgare*) can drive the wicked air from the spleen. Like sisal it drives gas out of the ovary. The seeds of the ovary dry completely. The pithy summac of Pliny (*Rhus coriaria*) relieves the whites (leucorrhea). Big prunes (*Prunes domestica*) as rue (*Ruta gravidens*) relieve the whites. Ores (seaweed ?) when drunk can ease the pain of the menses. Ocra soup (*Hibiscus eschulentus*) can I depend upon for the relief of excessive menses. For an extremely loose menses, alum in oaten whey ease them completely. True papaw (*Carica Papaya*) contains an essence that will start the menses early.

ing to Pliny, these pitches, are applied to the matrix by a wool pessary.

The verification in the laboratory of the efficacy of Askham's formula—at least as far as spindle is concerned—incites a desire to test others with the hope of finding useful therapeutic drugs. What other medical lore, scientific observations and medical thoughts and theories are contained in the entire manuscript should be made available to the scientific world with a cooperative viewpoint of all interested individuals.

APPENDIX

This manuscript was found in an ancient castle in southern Europe in 1912 by the late Wilfrid M. Voynich. According to this well-known collector of old manuscripts, "even a necessarily brief examination of the vellum upon which it was written, calligraphy, the drawings and the pigments suggested to me as the date of its origin the latter part of the thirteenth century."[14] From his examination, Mr. Voynich arrived at the following conclusions, that from "the history of this manuscript so far as at present can be ascertained or reasonably conjectured, we must conclude that it rested in some monastery in England, where Roger Bacon's manuscripts remained until the dissolution of the religious houses in the sixteenth century. At that time, together with other treasures from these disbanded libraries, it probably passed into the hands of one of the receivers of this spoil, the Duke of Northumberland. It was very likely one of the manuscripts probably found in this family's possession by John Dee, who certainly early in his career obtained a collection of Bacon manuscripts. During one of his visits to Prague, Dee undoubtedly presented it to Emperor Rudolph II, from whose possession it passed into the hands of Jacobus de Tepenecz not earlier than 1608. The manuscript then passed into the possession of a person whose name is at present unknown but who is known to have bequeathed it to Marcus Marci. It was given by Marci, in 1665 (or 1666), to Athanasius Kircher. Its subsequent history becomes again conjectural, and we may suppose that it was presented by Kircher to a patron in one of the ruling houses of Italy, after which it remained buried until it was discovered by me in 1912."[14]

At the same meeting of the College of Physicians of Philadelphia, April 20, 1921, that Mr. Voynich gave the above results of his investigation on the history of the manuscript, Professor W. R. Newbold, also discussed the possibility that Roger Bacon was the author of this manuscript.[6] Following Professor Newbold's death, Dr. R. G. Kent, Professor of Comparative Philology, University of Pennsylvania, collected the materials of Professor

Newbold and published a book on *The Cipher of Roger Bacon.*[7] In this book a discussion of the supposed decipherment of the Voynich Manuscript was presented. Several years later, in July 1931, Professor J. M. Manly criticized, at length, the supposed decipherment of Professor Newbold and arrived at the following conclusions, "it appears, then, that Professor Newbold's cipher systems and his decipherments were not discoveries of secrets hidden by Roger Bacon but the products of his own intense enthusiasm and his learned and ingenious subconsciousness. The systems are incapable of transmitting information definitely and accurately. Texts were deciphered into which Roger Bacon could not possibly have introduced the messages procured from them. And finally, historical criticism shows clearly that some of the most pretentious of the messages could not have been written by Roger Bacon or any other Englishman of the thirteenth century. That such a judgment must be passed upon the work of so learned and brilliant a scholar and so sincere and attractive a personality as Professor Newbold is almost tragic. I say, 'almost,' for after all, this record of defeat is none the less a record of scholastic heroism." [8]

Professor Manly also found that he could not, by the application of certain principles of decoding secret messages, decipher this Voynich Manuscript and therefore called it "The most mysterious manuscript in the world."

The interest of one of us (L. C. Strong) in this manuscript was aroused by a brief publication in *Speculum*, in January 1944 by Professor Hugh O'Neill entitled "Botanical Observations on the Voynich Manuscript." [9] According to this authority two of the plants represented in the manuscript were the common sunflower (Helianthus) and Capsicum. Both plants are of American origin and were unknown in Europe before the return of Columbus on his second voyage. This evidence rules out an origin for the manuscript in the 13th century, and brings its origin into the 15th or possibly the 16th century. These two centuries produced a considerable amount of work in cryptography, part of which has been investigated by the senior author. The details of decoding the Voynich Manuscript will be made available later.

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A JAPANESE PICTURE OF LEPROSY

ILZA VEITH

Among the early Western books on Japan there is one which has not had all the scholarly attention it deserves. The book was published in Amsterdam [1] in 1669 and bears the cumbersome title:

> *Denkwürdige Gesandtschafften der Ost- Indischen Gesellschaft in den Vereinigten Niederländern an unterschiedliche KEYSER von JAPAN Darinnen zu finden nicht allein die wunderlichen Begäbnüsse auf der Reyse der Niederländischen Gesanten sondern auch Eine Beschreibung der Dörffer / Festungen / Städte / Landtschafften / Götzengebeue / Götzendienste / Kleider-trachten / Heuser / Thiere Gewächse / Berge / Brunnen / als auch der alten und itzigen Kriegsthaten der Japaner: Mit einer grossen anzahl Kupferstücken / in Japan selbst abgerissen / geziert: Aus den Schriften und Reyseverzeichnüssen gemelter Gesanten gezogen / Durch ARNOLD MONTANUS.*[2]

The "Gesandtschaften" or "embassages" referred to in this title were actually delegations representing the Dutch trade settlement in Japan which were sent to the court of the *shogun* with requests for additional privileges or similar petitions. The journeys from Kiushu to the court at Yedo [3] were so long and offered such a variety of new

[1] The book was originally written in Dutch but was published simultaneously with the German translation. A French translation followed a few years later. Since the German translation follows the original faithfully, I feel justified in referring to it for the points I wish to make.

[2] "Most Memorable Embassages of the East-India Company of the United Provinces to the Emperors of Japan containing not only an account of many remarkable events that happened during the journey of the envoys but also the description of the villages, fortresses, towns, districts, temples of idols, idolatries, costumes, houses, animals, plants, mountains, fountains, as well as the ancient and present military deeds of the Japanese: adorned with a great number of copper-plates, which were drawn in Japan itself, and extracted from the writings and travel reports of the above mentioned envoys by Arnold Montanus."

For the sake of brevity I shall hereafter refer to the title as *Denkwürdige Gesandtschaften*.

[3] Now Tokyo.

sehen.

Ein wenig von diesem Wege ab / stehen hier und dar einzelne kleine Hütlein / aus Rohrstäben geflochten / und oben mit Bretern zugeleget. Hierinnen wohnen die Aussätzigen: die sich sehr ärmlich behelfen / und nichts haben / als ein Näpchen / und einen Korb. Doch findet man bey etlichen ein Hauptküssen / das sie an Bettestadt gebrauchen. Am Tache hänget ein Bäcken / darauf schlagen sie / wan einige Wandersleute vorbey reisen. Wan sie nichts bekommen / müssen sie Hunger leiden; weil ihnen auf leibesstraffe verbohten ist / in einige Dörfer oder Städte zu gehen. Und also verschmachten sie von Hunger und anderem Ungemache erbärmlicher weise. Es scheinet / daß der Aussatz in den Morgenländern viel gemeiner ist / als unter den Mitternächtischen Völckern. Herodotus meldet / daß die Persier einen Aussätzigen von aller menschlichen Beywohnung verstiessen / ja vor gottloß hielten / als einen solchen / der sich wieder die Sonne schwerlich versündigt.

Von Jut reiseten sie durch den Flecken

Fig. 1

Passage describing treatment of Japanese lepers (Montanus, *Denkwürdige Gesandtschaften*, p. 88.)

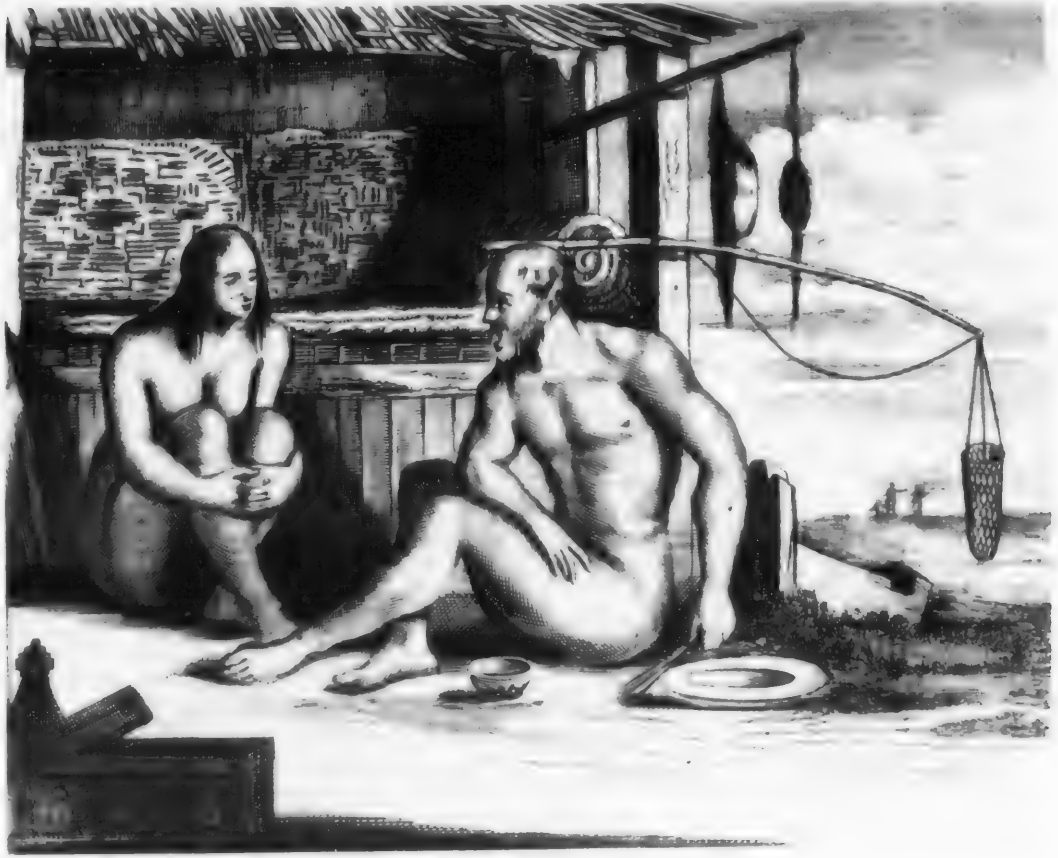

Fig. 2

Japanese lepers and their hut.

(Montanus, *Denkwürdige Gesandtschaften*, p. 89.)

impressions to the Dutchmen that they felt impelled to record their experiences minutely in diaries and travel reports. *Denkwürdige Gesandtschaften* represents a compilation of a number of such reports interwoven with the compiler's own reflections upon those features of Japanese customs which differed from the West, and with his speculations upon the historical basis of such differences.

Although the book is of great general value, covering as it does the period immediately before and after Japan's rigid seclusion, one short passage and an accompanying illustration are of specific interest to the historian of medicine, for here we find a description of the treatment of Japanese lepers. The passage bears the marginal title: "The miserable condition of the lepers in Japan," and reads as follows:

> A little removed from the path [leading from Okis to Kanibaro][4] are scattered small huts woven of bamboo sticks and covered on top with wooden planks. Inside there live the lepers: who fare very poorly, they possess nothing but a little dish and a basket. However, a few own a head pillow which they use instead of a bed. Suspended from the roof there hangs a gong upon which they beat when travelers pass by. When they fail to receive anything they must die of hunger; because they are forbidden by corporal punishment to enter some villages and towns. And thus they pine away with starvation and similar privations in a miserable manner. It seems that leprosy is much more frequent in Oriental countries than among the Occidental peoples. Herodotus reports that the Persians cast off a leper from all human habitation; nay, they even thought of him as godless as one who sins against the sun.[5]

The illustration accompanying this passage shows a man and a woman sitting in front of their hut, which contains the few implements specified in the preceding passage. In addition we see affixed to the wall a pole with a net bag attached to it; into this net the passers-by presumably dropped their donations in order to avoid direct contact with the lepers. The affliction of the man and the woman is indicated by small spots all over their bodies, faces, and heads.

[4] These names were written in a vague approximation of their sound. I am indebted to Mr. Nobitaka Ike, at present at the Walter Hines Page School of International Relations, The Johns Hopkins University, for his help in identifying these names and the particular location to which this passage refers. The settlement was located near the Suruga Bay, somewhat off the road between Okitsu and Kambara. The road is a part of the great Tokaido Road.

[5] *Denkwürdige Gesandtschaften*, p. 88.

and by the straggly thin hair of the woman and the bald patches of the man. Apart from the affected skin and hair, however, the bodies of the two lepers have a firm and strong and even well-nourished appearance which suggests that the illustrator may have drawn the picture from a description rather than from life. This hypothesis is further strengthened by the fact that both lepers are shown completely nude, a device which made it possible to emphasize the total skin affection as well as the abject poverty of the lepers.

This picture and the descriptive passage are of interest in the history of leprosy because they indicate that segregation of lepers, although perhaps only sporadic, was practiced in non-Christian countries as well as in those that were guided by the precepts of the Bible.

In Biblical antiquity all impurity was assumed to be contagious; lepers were considered unclean or impure and were therefore segregated. This concept and its consequence found expression in the thirteenth chapter of Leviticus. In the early Middle Ages, when leprosy became endemic and no known treatment proved effective, the Bible was resorted to and segregation became mandatory.[6] It is doubtful whether the measure was actually as effective as has sometimes been believed, for segregation was often enforced only after the leper had already infected others. Dr. Sigerist's suggestion that lepers, crowded in leprosaria and weakened by the disease, were especially good targets for secondary infections seems convincing. According to Dr. Sigerist, this fact explains the sharp decline of leprosy in Western Europe after the onslaught of the Black Death in the fourteenth century.[7]

In this connection it might be of value to examine some of the scattered references on the history of the treatment of the leper in Japan where, until quite recently, conditions prevailed which were somewhat similar to those of medieval Europe, and where, although a certain amount of segregation has been practiced for many centuries,

[6] Karl Sudhoff: "The Hygienic Idea and its Manifestations in World History," *Annals of Medical History*, vol. I, 1917, pp. 111-117. See also Karl Sudhoff: *Kurzes Handbuch der Geschichte der Medizin*, Dritte und Vierte Auflage von J. L. Pagels "Einführung in die Geschichte der Medizin" (1898), Berlin, 1922, p. 206.

[7] Henry E. Sigerist: *Civilization and Disease*, Ithaca, New York, 1943, pp. 71-75.

leprosy is still one of the major scourges.[8] While a great number of physicians and missionaries who came to Japan soon after its opening to the Western world lamented the miserable state of the roaming and begging leper in general, the passage and the illustration in *Denkwürdige Gesandtschaften* furnish a much earlier and much more concrete description of the methods employed in carrying out such segregation. However, before accepting the Japanese practice of segregation as independent of Western influence it is necessary to examine the historical setting of the book as well as additional material relating to the leper problem in Japan.

Denkwürdige Gesandtschaften, published at Amsterdam in 1669, was composed a little over a hundred years after the Portuguese arrived in Japan, the first Westerners to visit there since Marco Polo. Part of their missionary activity was the extending of medical help, and there are a number of references to Iberian priests who during the second part of the sixteenth century concerned themselves with the treatment of leprosy, even to the extent of founding hospitals for both "the poor and the lepers."[9] Thus one might feel inclined to think that the leper settlement described by Arnold Montanus in his *Denkwürdige Gesandtschaften* might be a carry-over from the Portuguese missionary period,[10] were it not for much earlier references to Japanese isolation of lepers which definitely antedate Christian influence in Japan.

Ancient Japanese history of leprosy is curiously similar to that of Biblical times. Like the Levites of Israel the early Shinto priests stressed above all the need for ritual purity and fought mercilessly any affliction that was considered unclean and polluting. Impurity—whether or not it was brought about through the fault of the

[8] In 1912 the ratio of known lepers per 1000 in Japan was 1.94. See Anthony Weymouth: *Through the Leper-Squint, A Study of Leprosy from Pre-Christian Times to the Present Day*, London [1938], App. II.

[9] Y. Fujikawa: *Japanese Medicine* (Clio Medica), New York, 1934, pp. 28 and 77. Anthony Weymouth, *op. cit.*, pp. 147-148. Albert S. Ashmead, "Christianity in Japan and the Leper Problem." An Address, New York, 1891, p. 6.

[10] The various leper hospitals themselves which had been built by Spanish and Portuguese missionaries and Christian Japanese were closed immediately upon the proscription of Christianity in the Tokugawa era. See Jingo Tobimatsu: *Hannah Riddell, Known in Japan as the "Mother of Lepers,"* Tokyo, 1937, pp. 6-7.

individual—was considered a tangible manifestation of sin. Ritual impurity could be incurred in many ways, as for instance by wounding, killing, desecration of corpses, bestiality, incest, tumors and leprosy. All these offences and afflictions were lumped together under the term *tsumi*, or " sin," and the offenders were placed under taboo. The early Shinto religion provided for purification rituals which in due time cleansed the sinners of their impurity. The lepers, however, whose impurity was of a concrete nature, could not return to the state of ritual purity by means of lustrations and ablutions; they remained subject to the taboo for as long as their disease persisted.

While studies on early Shinto observances reveal this information,[11] records of later periods contain little evidence which would show Shinto priests involved in the banishment of lepers. Unlike the case of medieval western Europe where the clergy revived and enforced the Biblical injunctions against leprosy, the Japanese priests seem to have grown oblivious of their duties in regard to the leper problem.

With the introduction of Buddhism into Japan in the 7th century A. D., the fate of the leper became again the concern of a religious organization. In 758 A. D., the Empress Kōmyō, the wife of the Emperor Shomu, founded in Nara what appears to be the first leper hospital in Japan.[12] The following legend, well-known throughout Japan, is connected with the opening of the hospital:

> The Empress had sworn to wash the bodies of a thousand lepers, a self-imposed task of castigation. She in consequence built a number of baths and asylums, in her castle at Kiota, and every sufferer from leprosy who presented himself at the gate was admitted to be washed by her royal hands. When she had cleansed nine hundred and ninety-nine she found that the last was the most offensive of all; but she did not shrink from the uncongenial task; she washed him gladly, and thus satisfied her vow. But lo! when she had done, the body which she had purified, was enveloped in light, and it was no man to whom she had rendered her service of mercy, but Buddha himself.[13]

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[11] G. B. Sansom: *Japan, A Short Cultural History*, New York, 1943, p. 52 ff. Also: F. Brinkley: *A History of the Japanese People from the Earliest Times to the End of the Meiji Era*, London, New York, 1915, p. 66.

[12] Y. Fujikawa, *op. cit.*, p. 9.

[13] Albert S. Ashmead, " A Japanese Specialist on Leprosy," *Journal of Cutaneous and Genito-Urinary Diseases*, vol. XII, no. 1, 1894, p. 108.

This legend serves not only to illustrate the national belief that a considerable leper problem existed at an early time, but also to symbolize the influence Buddhism had in the establishment of this hospital. The Empress' hospital was followed in the second half of the 13th century by another institution devoted to the same cause. This later leper home at Nara and the increasingly widespread practice of isolating lepers may well have been based upon a theory of contagion as it was expressed in the oldest and most influential Japanese medical book which is still in existence. This text, the *Ishinhō*,[14] composed in 982 A. D., declares that "leprosy is a communicable disease transmitted directly from man to man."[15] But this medical treatise was not the first text to point out the theory of contagion. Skin diseases and especially leprosy were considered of sufficient social significance to be mentioned in one of Japan's oldest law books, *Taiho-Rei* (702 A. D.) and in the *Reino-Gige*, or "Commentary to *Taiho-Rei*" (833 A. D.). In this latter work leprosy is described in great detail and warning is given that "one must not sleep in one bed with persons suffering from this disease, for this disease is contagious."[16]

It is interesting to note that during the Heian period (784-1186 A. D.) smallpox patients were driven out of their homes and treated in isolation with prayers and incantations. But this practice was due to the belief that sufferers from smallpox and other epidemics were victims of demons and their isolation was not intended as a public health measure. There is, however, no indication that leprosy was held to be of demonic origin, and since it was treated with moxa and acupuncture[17] it was presumably classified with those diseases that were caused by food and drink.[18]

While Japanese medicine of this period did not relate leprosy to

[14] (醫心方) 30 books.

[15] Fujikawa, *op. cit.*, pp. 11 and 15.

[16] Keizo Dohi: *Beiträge zur Geschichte der Syphilis insbesondere über ihren Ursprung und Pathologie in Ostasien*, Tokyo, 1923, p. 17.

[17] Fujikawa, *op. cit.*, p. 15.

[18] W. Norton Whitney, "Notes on the History of Medical Progress in Japan," *Transactions of the Asiatic Society of Japan*, vol. XII, Yokohama, 1885, p. 283. Later, however, these distinctions disappeared and, in concordance with Chinese theories, "wind" was held responsible for disease.

its demonological, i. e. religious, concepts, the legend connected with the founding of the early hospital in Nara shows that a special relation existed between Buddhism and leprosy. But the task of the Buddhist priest seems to have consisted of spiritual solace for the stricken rather than that of actual medication and did not involve consideration for the protection of the healthy. John Jackson, after an extended study of this problem, characterized this attitude: ". . . in Japan Buddhism discharges its duty to its lepers by casual charity, thrown as it would be thrown to dogs, and reaching but one here and there of these wrecks of humanity." [19] Yet only an over-all organization of the nature of a church could have enforced uniformity in the practice of the segregation of the leper in Japan which was, until the middle of the last century, divided into more or less autocratic feudal states. Without the help of such an organization any local effort was bound to be confined to certain districts. In consequence the Japanese attitude toward leprosy differed greatly in the various sections of the country and this is reflected in the reports of European missionaries and physicians.

Thus while Arnold Montanus could report his own experience with the rigid isolation he had witnessed in the region of Suruga Bay in the early seventeenth century, we read in an anthology of leprosy, published in 1914, that in Japan the disease is not considered contagious and that the Japanese do not show any repugnance against the lepers but maintain intimate relations with those who live in their midst.[20] However, on the next page of the same anthology it is mentioned that marriage between lepers and non-lepers is not permitted and that houses of prostitution maintain leprous girls which are destined for leprous visitors. Other reports, again, slightly earlier than, or contemporary with the anthology describe leper colonies and leper villages which have existed for many generations.[21]

[19] John Jackson: *Lepers, Thirty-six Years' Work among Them, Being the History of the Mission to Lepers in India and the East, 1874-1910*, London, Edinburgh, n. d.

[20] Démétrius Al. Zambaco Pacha: *La Lèpre à travers les Siècles et les Contrées, Anthologie*, Paris, 1914, pp. 577 ff.

[21] S. Kitasato, "Die Lepra in Japan," *Zeitschrift für Hygiene und Infektionskrankheiten*, Bd. 63, Leipzig, 1909, p. 508;—Jingo Tobimatsu, *op. cit.*, p. 37;—Ashmead, "A Japanese Specialist on Leprosy," *loc. cit.*, p. 109. Among the leper

The "Study of the Despised" which was published in 1847 contains a terse description of such a settlement:

> Perhaps due to an age-old custom pertaining to the segregation of lepers outside of a community to prevent them from communicating the disease to the rest of their families, a colony of lepers called Monoyoshi has been in existence in the eastern suburbs of Kyoto. The villagers, doing small-scale farming and making sandals, never come out of the village except once a year at the New Year season when they trek to the city to beg for alms at every door. . . . I often hear that the people with the aforementioned disease in other provinces also congregate by themselves. I suspect that it must be the custom to segregate such people in the same manner as in Monoyoshi.[22]

Much of this disparity of observation is due to the environment and social setting in which each study was undertaken. Montanus saw the leper huts in the country removed from larger cities, and, as it is stated by Dr. Ashmead who, as the Foreign Medical Director of the Tokyo Hospital, was particularly concerned with the study of leprosy during his long residence in Japan, "leprosy in Japan is a disease of villages and hamlets. . . ." [23]

It seems that in those rural districts where leprosy was endemic, it was fought by a rigid exclusion of the leper from all human intercourse, and that there the conditions prevailed which are described at a much earlier date in the *Denkwürdige Gesandtschaften*. It also appears that in most rural communities a known case of leprosy stigmatized an entire clan, even after the leprous member had been

settlements the colony near the springs of Kusatsu is most frequently mentioned. The chief constituents of these springs are mineral acids, sulphur, iron, alum, and arsenic, and they are commonly believed to be of curative power in leprosy. The temperature of the bath ranges from 113° to 128° Fahrenheit. Since this is uncommonly hot even for Japanese bathers and the baths make great demands upon individual courage, the patients voluntarily submit to a semi-military discipline which forces them into the scalding water. For a detailed description on the rituals of these baths see: Basil Hall Chamberlain and H. B. Mason: *A Handbook for Travellers in Japan*, London, 1901, pp. 190-191.

[22] Motoori Uchitô (本居内遠): *Senja-kô* (賤者考) which is to be found in *Koji ruien* (古事類苑) [Encyclopaedia of Antiquities] v. 26, p. 1386, Tokyo, 1909. I am indebted for this quotation to Mr. John R. Shively, Chief, Japanese Section, and to Mr. Andrew Kuroda, also of the Japanese Section of the Library of Congress.

[23] Ashmead, "Christianity in Japan and the Leper Problem," *loc. cit.*, p. 6.

expelled from the family.[24] Thus it can be easily understood that in Japan, where the honor of the family was of much greater importance than the welfare of its individual members, the stricken one would frequently remove himself voluntarily before discovery in order to prevent shame and disgrace from falling on his relatives.[25] In other cases, however, the entire clan took upon itself the fate of its leprous member: "When a member of a family finds itself stricken by leprosy, he is very often accompanied in his retirement by all the members of his family; they will not allow him to sacrifice himself in order to save them from leper ostracism." [26] Whether this occurred very often is open to doubt, if one considers the hosts of begging lepers whom Miss Hannah Riddell encountered in the temple of Hommyoji [27] and notes her report, authenticated by Japanese, that not even the ashes of dead lepers were received by their clans.

These reports of drastic segregation in rural areas, do not, however, by any means discredit the statements of those who had encountered none of it in the cities. Expulsion of the leper was largely the affair of the family, and the majority of the city dwellers, removed from the jurisdiction of their clan, were not forced into retirement. The number of these lepers was undoubtedly larger than recorded because of the many who were kept concealed by their families, either in an attempt to spare them the dreadful fate of

[24] Dr. Mikinosuke Miyajima in his book entitled *Robert Koch and Shibatsaburo Kitasato*, Geneva, 1941, p. 93 ff., explains the reasons for this general disgrace as follows: "Although there is no doubt about the infectious nature of leprosy, the fact remains that new cases of this disease appear usually among near blood relatives and the contagion among non-blood relatives is very rare. This fact has led from ancient times in Japan to believe leprosy as a hereditary disease, and this belief still persists among the people at the present day. In case of marriage, any hereditary trace of this disease is rigorously searched in order to exclude any one whose relatives had been victims of this disease." See also Ashmead, "A Japanese Specialist on Leprosy," *loc. cit.*, pp. 108-109.

[25] Jingo Tobimatsu, *op. cit.*, p. 15.

[26] Ashmead, "A Japanese Specialist on Leprosy," *loc. cit.*, p. 109.

[27] Jingo Tobimatsu, *op. cit.*, p. 13. The temple Hommyoji of the Hokke Sect near the city of Kumamoto on Kiushu is the burial place of Kato Kiyomasa, a great statesman and general, who died in the early seventeenth century. Legend tells that Kiyomasa contracted leprosy and was cured after he had become a member of the Hokke Sect; the temple consequently became a place of pilgrimage for lepers.

abandonment or to prevent the world from knowing about their leprous member. Thus in spite of the strong innate trend among the Japanese towards segregation, which was more recently reinforced by the efforts of Western missionaries and physicians, there remained enough lepers in the midst of the healthy population to serve as foci of infection.

Japan's high leprosy rate in 1912 is a vivid illustration of the fact that sporadic segregation, no matter of how severe a nature, is quite ineffective. Dr. Papellier reported that according to official estimates there were 105,585 lepers in Japan; he estimated, however, that actually the number must have been much higher.[28] When Dr. Robert Koch visited Japan in 1908, he was under the impression that the practice of isolation had been rigidly enforced for the past forty years preceding his visit, i. e. since the opening of Japan, and he was all the more struck by his discovery that leprosy had increased rather than decreased during this period. He attributed this phenomenon to the fact that isolation, as a rule was only applied after the symptoms of leprosy had become manifest and hence the leper spent much of the contagious stage of the disease in unrestricted freedom.[29] Yet this condition also prevailed in medieval Europe, and leprosy vanished nevertheless. Dr. Koch's disappointment might have been tempered had he realized that, what he took for a forty year old rigid segregation, was only a continuation of numerous instances of indigenous practices, as that described in the *Denkwürdige Gesandtschaften*, and scattered efforts of missionaries and Western physicians.

As a matter of fact, the Japanese government had not begun to concern itself with the leper problem until 1907, or one year prior to Dr. Koch's visit, when it enacted legislation for the erection of interprefectural leper colonies in several locations;[30] and only in 1930 was

[28] *Münchener Medizinische Wochenschrift*, 30. Juli, 1912.

[29] "Address" of Robert Koch, held at the Seventh International Tuberculosis Conference, Philadelphia, 24th-26th of September, 1908. The *Report* of this conference was published in Berlin-Charlottenburg, 1909. See pp. 58-60.

[30] Preface by Keiichi Suzuki, Governor of Kumamoto Province, to Tobimatsu's *Hannah Riddell, loc. cit.*, p. v.

this rather inadequate law supplemented to cover the entire country.[31] Since the five state leprosaria and the few private institutions that had been built between 1907 and 1930 were thoroughly unable to accommodate all of Japan's lepers,[32] it is reasonable to assume that in many rural areas the conditions described by Arnold Montanus obtained until quite recently.

[31] Mikinosuke Miyajima, *Robert Koch and Shibatsaburo Kitasato*, pp. 88-89.

[32] According to several censuses taken during this period, leprosy had declined to some extent. However, these censuses reflect not only the leper law of 1907 but also the shift of population caused by the industrialization of Japan and the subsequent rise in the standard of living. (The censuses are recorded on p. 92 of the work quoted above.)

THE ETHICAL PRACTICES OF SIR HANS SLOANE

A Brief Note Based on Statements made in Sir Hans Sloane's "An Account of a Most Efficacious Medicine for Soreness, Weakness, and Several other Distempers of the Eyes" [1]

JULIUS A. OSHLAG

Garrison, in writing of 18th century medicine, states that, "Nearly every one of the great physicians of the time stood upon a pedestal all his own, and many of these, as Welch has said, 'Let it be known' that they were in possession of private or secret remedies which were superior to all others." [2] This "periwigged period" was the era of Timothy Byfield's sal oleosum volatile, of Stoughton's Great Cordial Elixir, of John Hooper's Female Pills, of Della Lena's Powder of Mars, and of Tuscora Rice for consumption.[3] Quackery flourished on a grand scale. Read, a tailor, with no training whatsoever, became oculist to both Queen Anne and George I. "Spot" Ward, originally a drysalter with an excellent press agent, numbered among his patients Chesterfield, Walpole and Gibbon. Perkins' Tractors, Graham's Temple of Health, the Loutherbourgh cure by "stroking," all attracted tremendous numbers of followers, while on the continent Ailhaud developed and sold a powder which is said to have destroyed as many people as Napoleon's campaigns.[4]

Although living and practicing in this artificial atmosphere, Sir Hans Sloane (1660-1753) was the antithesis of these frauds. and his practice was in direct contrast with their fraudulent ways. Sir Hans, with the help of the College of Physicians, opened a dispensary in December 1696, whereby the poor could receive gratuitous medical care, was a generous benefactor of most of the hospitals of London,

[1] Sloane, Sir Hans: *An Account of a Most Efficacious Medicine for Soreness, Weakness and several other Distempers of the Eyes.* London. Dan Browne, at the Black Swan without Temple Bar, 1745.

[2] Garrison, F. H.: *An Introduction to the History of Medicine*, ed. 4, Philadelphia, W. B. Saunders Company, 1929, p. 381.

[3] *Ibid.*, p. 386.

[4] *Ibid.*, pp. 386-8.

became a physician to Christ's Hospital, and returned his salary each year to the hospital. Poor patients were seen without fee until ten each morning, and innumerable appeals for pecuniary and professional help made to him rarely went unanswered.[5] A " physic " garden at Chelsea was presented by Sir Hans to the Apothecaries Company in 1722, and he gave large numbers of specimens of plants and animals, obtained during his visit to Jamaica, to the then embryonic British Museum.[6]

Despite Sir Hans' great reputation as a physician, as a student of the biological sciences, and as a leader of British medicine, Garrison includes Sloane, along with Hoffman, Stahl and Mead, as among those 18th century physicians who made money by selling preparations with secret formulas.[7] In 1745, Sloane published an article on the treatment of " Sore Eyes." This article has been the subject of a very scholarly paper by Dr. Burton Chance [8] which appeared in the *Archives of Ophthalmology* in 1938. Dr. Chance reviews with great care the ophthalmological aspects of Sir Hans' publication and discusses in some detail the stringent criticism appearing in *Gentlemen's Magazine* in 1771, by one who signs himself " Investigator," but although certain paragraphs of Sir Hans' work dealing with his feelings regarding the ethics of practice are reprinted, it appeared to me that the importance of this aspect had not been sufficiently stressed. It may well be that the liniment proposed for relief of various " distempers " of the eyes was worthless and perhaps even harmful, but in the " Golden Age," adherence to the doctrines of the avoidance of secrecy in the matter of remedies, and the welfare of the public placed above selfish benefit, are deserving of special mention. Sir Hans' feelings in regard to these two matters are well brought out in several pertinent paragraphs.

Sir Hans' remedy for sore eyes was kept secret for " many years " because of his promise not to divulge it. On pages 1 and 2, he states:

[5] Chance, B. Sketches of the Life and Interests of Sir Hans Sloane, *Annals of Medical History*, 10: 392-3 (September) 1938.

[6] Guthrie, D.: *A History of Medicine*, Philadelphia, J. B. Lippincott Company, 1946, p. 192. Chance, B.: *loc. cit.*, p. 392.

[7] Garrison, F. H.: *loc. cit.*, p. 392.

[8] Chance, B.: Sir Hans Sloane's Account of an Efficacious Medicine for Soreness of the Eyes, *Archives of Ophthalmology*, 19: 912 (June) 1938.

Through an earnest Desire to be useful in my Profession, the Practice of Physic, to which I was led by a strong natural Inclination, I was always very attentive to Matters of Fact, and the real Cures that fell under my Observation. Of these I saw many performed upon sore Eyes by Doctor Luke Rugeley; whereupon I applied to a very understanding Apothecary of his particular Acquaintance and mine, and endeavored, though without Effect, to procure some Knowledge of the Medicine he made use of. After the Doctor's Death, I still pursued my Enquiry, by searching into his printed Books and Manuscript Papers, and particularly into a very curious Materia Medica left by Him: but all in vain; 'till at length a Person, whom I believe he had employed in making his Medicine, came to me; and for a pecuniary Reward, joined to a Promise of not divulging it to his Prejudice, delivered me up the genuine Receipt, in the Doctor's own Hand-Writing; which, as I reformed, improved and used it many Years, is as follows.

Sloane's enemies declared that publication of the remedy followed when he "had no further use for the vaunted mess"[9] (which may possibly be true since the date of publication, 1745, corresponds with Sir Hans' 85th year). However, further perusal of the article reveals that Soane considered himself so bound by the promise of secrecy that he would not reveal it despite the offer of great personal gain. Reference in support of this point may be found on pages 8 and 9.

Monsieur Anisson, who was sent hither with the Duke d'Aumont, commissioner for settling a Treaty of Commerce with England, brought me recommendatory Letters from some Friends in France. I observed a great Soreness and Weakness in his Eyes: of which the Application of my Medicine very soon cured him. Whereupon he assured me, that he would procure me from the King, his Master, any Reward I should think fit to ask for the Secret; he being accustomed to oblige his Subjects that way: but I answered him, that I was then bound by a Promise to conceal it.

Further reference to Sir Hans' feeling in regard to his original promise of secrecy is to be noted in the matter of an improvement in the formula as first obtained. This improvement, the substitution of Viper's Grease for the hog's lard, made the medicine "do wonders." On page 11, Sir Hans says,

And as I was not bound to Secrecy, with regard to this Improvement, I communicated it to the late Dr. Arbuthnot: who, after repeated Trials of that Fat alone on sore Eyes, had so high an Opinion. . . .

The reason for the release of the secret and Sloane's attitude in regard to secret remedies in general is to be found on pages 13 and 14.

[9] Chance, B.: Sketches of the Life and Interests of Sir Hans Sloane, *loc. cit.*, p. 396-7.

I had formerly, as already said, promised Secrecy with regard to this Medicine: which I have religiously kept 'till now, that I think myself, for many Reasons, abundantly absolved. I have had some other Medicines of the like Nature communicated to me under the same Restriction; and exclusive of these few Cases, I cannot charge myself with making the least Mystery of my Practice. For in Consultations, in a Number of Cases of Importance, I have been always very free, and open; far from following the Example of some Physicians of good Morals and great Reputations, who have on many Occasions thought proper to conceal Part of their own acquired Knowledge, alledging the Maxim: Artis est celare Artem. And that I have not been inclined to conceal or monopolize Medicines of great Use, the following Instance will sufficiently shew.

Pages 14 to 17 of the article are then taken up with the manner in which a remedy for mad dog bite was secured and made available because of the great " Consequence to the Public."

Sir Robert Southwell, a very worthy President of the Royal Society, who was a Patron to many Persons of Merit, and among others to Captain Dampier, told me that the Captain in Conversation let him know that his Family, at Exmouth in Devonshire, had a secret Medicine whereby they infallibly cured all Men and Beasts, bit by Mad Dogs and other Creatures. Whereupon I earnestly entreated Sir Robert to use his Interest with the Captain to procure, if possible, a full Account of it, as a Matter of great Consequence to the Public. Sir Robert readily complied, and at his Request Captain Dampier obtained from his Relations the Account thereof, which I published entire in the Philosophical Transactions No. 237, with all the necessary Circumstances to be observed; several of which were afterwards omitted by the Abridgers of that Paper.

When Sir Hans discovered that one of the herbal ingredients had been wrongly identified, he corrected the error and

accompanied the Publication of the Letter or Account, with a Remark . . . at the same time acquainted Mr. Petiver, Mr. Doody, Mr. Rand, and other Botanists, with the Discovery of this Matter; and recommended to them to provide a Quantity of this Lichen, sufficient to answer all Occasions.

CONCLUSIONS: Evidence is presented that Sir Hans Sloane, by his own statements at least, was one of a minority who in the late 17th and early 18th centuries upheld the doctrine of " no secret remedies." Additional evidence of his well-known interest in the welfare of the public and the advancement of the practice of medicine is also given.

BIBLIOGRAPHIES

A CHECK LIST OF MEDICAL BOOKS PUBLISHED IN ENGLISH BEFORE 1600

K. F. RUSSELL

"Gentyll readers, I haue teken some peyne in making this booke, to doo sicke men pleasure, and whole men profyt, that sicke men may recuperate theyr helth, and whole men may preserue themselues from sicknesse (with Gods help) aswell in phisicke as in chirurgerie. But for as much, as olde auncient and autentike auctours or doctours of phisicke, in their bokes, doth write many obscure terms, geuing also to many and diuers infirmities darke and hard names, difficile to understande, some and most of all beinge Greke wordes, some and fewe being Araby wordes, some being latin words, and some being barbarous words. Therfore I haue translated all such obscure words and names into English, that euery man openly and apartly may understand them. Furthermore al the aforesayde names of the said infirmities be set together in order, according to the letters of the alphabete, or the A, B, C. . . . Also there is no sicknes in man or woman, the which may be from the crowne of the head to the soole of ye foote, but you shal fynde it in this booke. . . . And for as much as euery man now a dayes, is desirous to reede briefe and compendious matters, I therfore in this matter pretend to satisfy mens mindes as much as I can, naming this boke according to the matter, which is, The Breuiary of health."

The above extract from Andrew Boorde's *Breuiary of Health*, read some years ago, resulted in the present author becoming interested in the early printed English medical literature. By reference to the catalogues of various libraries, standard monographs on the subject and booksellers' lists a file-index was gradually compiled of every item printed in English before 1600, and as far as possible all editions were noted of each item.

It was thought that the list would be of interest to others and it is therefore presented in this article, and while it is felt that the list is

not complete, it is hoped that perhaps other authors may be able to supply deficiencies.

Study of the list reveals that the books fall roughly into three catagories:

(1) Popular health recipes collected from various authors, translated and issued for the use of the non-medical public.

(2) Books on the plague issued and reissued during the various visitations of the plague of England.

(3) Translations of an author's work so that it might be more widely read both by the medical profession and the public.

The scientific language of this period was, of course, Latin and the relatively large number of books printed in English before 1600 would seem to indicate that there was an attempt to break away from this tradition and issue books in the vernacular; the vernacular issue, however, usually following a Latin edition.

A large number of the works were translated by non-medical men and frank "pirating" of an author's work without acknowledgment was not unknown.

In the list which follows the titles of as many of the items as possible have been expanded from the entry in the *Short-Title Catalogue*.

"HERBALS" have not been included. These have been listed most admirably and completely by Dr. H. M. Barlow in the *Proceedings of the Royal Society of Medicine*, 1913-14, to which reference should be made.

The number in brackets which follows each entry in the list below corresponds to the entry in Pollard and Redgrave's *A Short-Title Catalogue*. Where no such number follows the entry, that item is not listed by Pollard and Redgrave.

¶ Here begynneth a litil boke the which trayted and treted many gode thinges neceſſaries for the infirmite & grete ſeke: neſſe called Peſtilence the whiche oftentimes enfecteth vs made by the moſt expert Doctour in philike Biſſhop of Aruliens in the realme of Denmark &c

AT the reuerence & Worſchip of the bleſſed Trinite & of the glorious Virgyn ſaynt Marye & the conſeruacion of the comyn Welle of alle criſten people / as Wel for them that ben hole as for remedie of them that ben ſeke / I the biſſhop of Aruſiens in the realme of Denmark doctour of Phiſique Wille Write by the mooſt expert and famous doctours auctoriſed in Phiſike ſomme thynges of the infirmite of peſtilence Whiche dayly enfecteth / & ſone ſuffreth Vs to departe oute of this lyfe

Firſt I Wil Write the tokenes of this Ifirmite
The ſecond the cauſes Wherof yt cometh
The thirde remedies for the ſame
The fourth comfort for the hert & the principal

The first leaf from Bengt Knutsson's "Litil boke for the Pestilence" circa 1485. The John Rylands Library, Manchester possesses the only known copy.

In this tertyse that is clepyd Gouernayle of helthe: What is to be sayd wyth cristis helpe of some thynges that longen to bodily helthe/hadde and to be kept or to bodily helthe lost and to be recouered/ and is departed in viij. chapytures/that is to saye In the fyrste chapytre of the profyte of goode Gouernayle of helth/In the ij. chapytre what is fyrst on mowlo to be don/In the iij. chapitre of bodyly exercyse/ that is to saye. besynes & his profyte; In the fourth chapytre of sypres of exercise/In the fyfthe chapitre how amā shold haue hym in mete.in etyng his metes: In the vj. chapitre how a man shold haue hym in drynkyng of his drynkes/In the vij. chapytre what shold be done after mete/In the viij chapytre of the nopse of cupll gouernaunce

IT nedyth hym that woll haue longe lyff to knowe the crafte of holsome gouerneple. And so for to kepe contynuelly the helthe of his body/ for els he maye not com to

The first leaf of the "Gouernayle of helthe" printed by William Caxton circa 1489.

AGRIPPA, Henry Cornelius

Of the Vanitie and Uncertaintie of Artes and Sciences, Englished by Ja. Sa. (James Sanford) Gent. 4to.

LONDON. Henry Wykes 1569 (204)

Another edition.
LONDON. H. Bynneman 1575 4to. (205)
Contains five chapters on Medicine.

ALBERTUS, Magnus

Secretes of the vertues of herbes. 4to.

LONDON. W. Copland (1549) (259)

—— The boke of secretes. 4to.

LONDON. W. Copland n.d. (260)

Other editions.
LONDON. W. Copland (not after 1560) 8vo. (261)
LONDON. W. Seres (1570?) 12 mo. (262)
LONDON. W. Jaggard 1595 12mo. (263)
LONDON. For W. Jaggard 1599 8vo. (264)
LONDON. W. Jaggard 1617 12mo. (265)
LONDON. I. Jaggard 1626 8vo. (266)
LONDON. T. Cotes for A. Kembe 1637 8vo. (267)

ALEXIS of Piedmont

The secretes of the reverende Maister Alexis of Piedmount. Containyng excellent remedies against diuers diseases, woundes, and other accidents, with the manner to make distillations, perfumes, confitures, diynges, fusions, and meltynges . . . translated . . . by Wyllyam Warde. 4to.

LONDON. Imprynted by Iohn Kingstone for Nicolas Inglande 1558 (293)

Other editions.
LONDON. Henry Sutton 1559 4to. (295)
LONDON. Rowland Hall for Nycolas Englande 1562 4to. (296)
LONDON. R. Hall for Nycolas Englande 1563 4to.
LONDON. H. Bynneman for J. Wight 1568 4to. (297)
LONDON. John Kyngston for John Wight 1580 4to. (298)
LONDON. W. Stansby for R. Meighen 1615 4to. (299)

—— The second part of the Secretes. 4to.

LONDON. Iohn Kyngston for Nicholas Englande 1560 (300)

Other editions.

LONDON. Rowlande Hall for Nicholas England. 1563 4to. (301)
LONDON. Henry Bynneman for John Wyght (1568?) 4to. (302)
LONDON. J. Kyngston for J. Wight 1580 4to. (303)
LONDON. W. Stansby 1614 4to. (304)

—— The thyrde and last parte of the Secretes. 4to.

LONDON. R. Hall for N. Englande 1562 4to. (305)

Other editions.

LONDON. H. Denham for J. Wight 1566 4to. (306)
LONDON. T. Dawson for J. Wight 1578 4to. (307)
LONDON. W. Stansby 1614 4to. (308)

—— The fourthe and finale booke of his Secretes. Translated out of Italian into English by Richard Androse. 4to.

LONDON. Henry Denham 1569 (309)

Other editions.

LONDON. John Wyght 1578 4to. (310)
LONDON. W. Stansby 1614 4to. (311)

—— An edition of all four parts was printed in LONDON by Peter Short for Thos. Wight 1595 4to. (312)

ANDERSON, *Anthony*

An approved medicine against the plague. 4to.

LONDON. J. Est 1593 (566)

ANONYMOUS

Ane breif descriptioun of the qualiteis and effectis of the well of the Woman Hill besyde Abirdene. 4to.

(EDINBURGH. J. Ross) 1580 (6767)

—— The true reporte of a monstrous childe, borne at Muche Horkeslye. folio.

LONDON. T. Marshe (1562) (12207)

ANTIDOTHARIUS The

The Antidotharius, in the whiche thou mayst lerne howe thou shalte make many and dyuers noble plaisters, salues, oyntementes, powders, bawmes, oyles, and wounde drynkes, the

whiche be verye necessarye, and behouefull, utyle, and profytable for euery Surgyan, therin to be experte, and redy at all tymes of nede. 8vo.

LONDON. Imprynted by me Robert Wyer (1530?) (675)

Other editions.
LONDON. Robert Wyer (1538?) 8vo. Two issues (675a and 676)
LONDON. Robert Wyer (1542?) 8vo. (677)
LONDON. Robert Wyer (1545?) 8vo. (678)

ARCEUS, Francis 1493-1573?

A most excellent and compendious method of curing woundes in the Head, and in other parts of the body . . . Translated into English by John Read, chirurgion of London, with the exact cure of the Caruncle and Fistulae and description of the emplaister called Dia Chalciteos. 4to.

LONDON. T. East for T. Cadman 1588 (723)

ARNALDUS, de Villa Nova

Here is a newe boke called the defence of age and recovery of youth . . . Translated by J. Drummond. 8vo.

LONDON. R. Wyer (1540?) (777)

ASCHAM, Antony

A litell treatyse of astronomy, very necessary for physyke and surgerye, declarynge what herbes, and all kynde of medecynes are appropryate and under the influence of the planetes. And also the partes and members of the bodye thereto correspondynge, and howe ye shall brynge the vertue of the heuens and nature of the stars to euery parte of mans bodye beynge deseased. 8vo.

LONDON. Wyllyam Powell 1552 (857a).

BACON, Roger 1214-1294.

This boke doth treate all of the beste waters artyficialles and the vertues and properties of the same moche profytable for the poore sycke . . set forth by syr Roger Becon Freere. 8vo.

LONDON. Imprinted by me Robert Wyer (1530?) (1180)

BAILEY, Walter 1529-1592.

A briefe treatise touching the preservation of the eie sight consisting partly in good order of diet, and partly in use of medicines. 8vo.

LONDON. 1586 (1193)

Other editions.
LONDON. R. Waldegrove for T. Man and W. Brome n.d. (1194) (Annexed to J. Guillemeau "Treatise of the eyes")
OXFORD. Joseph Barnes 1602 8vo. (1195)
OXFORD. Joseph Barnes 1616 8vo. (1196)

—— A briefe discours of certain bathes in the Countie of Warwicke neere Newnam Regis. 8vo.

(LONDON). 1587 Two issues (1191 and 1192)

BAKER, George 1540-1600.

The composition or making of the moste excellent and pretious oil called oleum Magistrale. . . . Also the third book of Galen of curing prickes and wounds of sinowes . . . A brief gathering togither of certain errours which the common chirurgians use. Gathered and translated by G. B. 8vo.

LONDON. J. Alde 1574 (1209)

BALISTA, Christopher

Ouerthrow of the gowte, written in Latin verse by Chr. Balista, translated by B. G. (Barnaby Googe). 8vo.

LONDON. Abraham Veale 1577.

BANNISTER, John 1540-1600.

A needful, new and necessarie treatise of chyrurgerie, briefly comprehending the generall and particular curation of ulcers, drawen foorth of sundrie worthy wryters, but especially of A. Calmetus Vergesatus and J. Tagaltius . . . Hereunto is annexed certaine experimentes of mine owne invention, truely tried, and daily of me practiced. 12mo.

LONDON. T. Marshe 1575 (1360)

Another edition.
LONDON. T. Harper 1633 4to. (1361)

—— The Historie of Man, sucked from the sappe of the most approued Anathomistes, in this present age, compiled in most compendious fourme, and now published in English, for the utilitie of all godly Chirurgions, within this Realme, by Iohn Banister, Master in Chirurgerie and Practitioner in phisicke. folio.

LONDON. Iohn Daye 1578 (1359)

—— An antidotarie chyurgicall, containing great varietie and choice of all sorts of medicines that commonly fal into the chyurgions use. 8vo.

LONDON. Th. Orwin for Th. Man 1589 (1358)

BARKER, John

The true description of a monsterous chylde. folio.

LONDON. W. Gryffith (1564) (1422)

BARROUGH, Philip

The Methode of Phisicke, conteyning the causes, signes, and cures of inward diseases in man's body from the head to the foote. Whereunto is added, the forme and rule of making remedies, and medicines, which our Phisitians commonly use at this day, with the proportion, quantitie, and names of ech medicine. folio.

LONDON. Thomas Vautroullier 1583 (1508)

Other editions.

LONDON. R. Field 1590 4to. (1509)
LONDON. R. Field 1596 4to. (1510)
LONDON. R. Field 1601 4to. (1511)
LONDON. R. Field 1610 4to. (1512)
LONDON. R. Field 1617 4to. (1513)
LONDON. R. Field 1624 4to. (1514)
LONDON. G. Miller 1634 4to. (1515)
LONDON. G. Miller 1639 4to. (1516)

BARTHOLOMAEUS, Anglicus 13th Century.

Batman uppon Bartholome, his booke De proprietatibus rerum. folio.

LONDON. T. East 1582 (1538)

BEZE, Theodore de

A short, learned and pithie treatize of the plague, wherein are handled these two questions: the one, whether the plague bee infectious or no: the other, whether and howe farre it may of Christians bee shunned by going aside . . . newly turned into English by J. Stockwood. 8vo.

LONDON. T. Dawson for J. Bishop 1580 (2046)

BOOK The

The boke of knowledge whether a sycke person beynge in perylle shall lyve or dye. 8vo.

(LONDON. Robert Wyer 1535?) Two issues (3320 and 3320a)

—— Here begynneth a lytell boke of the xxiiii stones pryncipall, that profyteth most to mans body, as ye day and the nyght hath xxiiii houres, so be there xxiiii stones pryncipall. 8vo.

(LONDON. Robert Wyer 1535?) (3361)

—— A booke of soveraigne approved medicines and remedies as well for sundry diseases within the body as also for all sores, woundes, goutes, and other griefes. 8vo.

LONDON. T. Dawson and T. Gardyner 1577 (3356)

BOORDE, Andrew 1490-1549.

The boke for to lerne a man to be wyse in buylding of his howse for the helth of body and to holde quyetnes for the helth of his soule and body. The boke for a good husbande to lerne. 8vo.

LONDON. Robert Wyer (1540?) (3373)

—— Hereafter foloweth a compendyous regyment or a dyetary of helth, made in Mountpyllier, compyled by Andrew Boorde of Physycke doctour, dedycated to the amypotent Prynce and valyaunt Lorde Thomas Duke of Northfolche. 8vo.

LONDON. Robert Wyer 1542 (3379)

Other editions.

LONDON. Robert Wyer 1547

LONDON. Wyllyam Powell 1547 4to. (3380)

LONDON. T. Colwel 1562 8vo. (3381)

LONDON. H. Jackson 1576 8vo. (3382)

—— The Breuiary of Helthe, for all maner of syckenesses and diseases the whiche may be in man, or woman doth folowe. Expressynge the obscure termes of Greke, Araby, Latyn, and Barbary in to englysh concerning Phisicke and Chierurgye compyled by Andrewe Boord of phisicke Doctour an englysh man. 4to.

LONDON. Wyllyam Myddleton 1547

Other editions.

LONDON. Wyllyam Powell 1552 4to. (3374)
LONDON. Wyllyam Powell 1557 4to. (3375)
LONDON. Thomas East 1575 4to. (3376)
LONDON. Thomas East 1587 4to. (3377)
LONDON. Thomas East 1598 4to. (3378)

BOSTOCK, Robert

The difference betweene the auncient phisicke and the latter phisicke.

LONDON. R. Walley 1585 (1064)

BRASBRIDGE, Thomas

The poore mans Jewel, that is to say a treatise of the pestilence unto which is annexed a declaration of the vertues of the hearbs Carduus Benedictus and Anglica. 8vo.

LONDON. G. Byshop 1578 (3549)

Other editions.

LONDON. G. Bishop 1579 8vo. (3550)
LONDON. 1580 (?3551)
LONDON. Georg. Bishop 1592 8vo. (3552)

BRIGHT, Timothy

A treatise of melancholie, containing the causes thereof. 8vo.

LONDON. T. Vautrollier 1586 (3747)

Other editions.

LONDON. J. Windet 1586 8vo. (3748)
LONDON. W. Stansby 1613 8vo. (3749)

—— A treatise wherein is declared the sufficiencie of English medicines for the cure of all diseases cured with medicine. 4to.

LONDON. H. Middleton for T. Man 1580 Two issues. (3750 and 3751)

Another edition.
LONDON. H. Lownes for T. Man 1615 8vo. (3752)
This item is sometimes assigned to Thomas BEDFORD; only the initials T. B. appearing on the title-page.

BRUNSCHWIG, Hieronymus ca. 1450-1533.

The noble experyence of the vertuous handywarke of Surgeri, practised and compyled by the moost experte mayster Jherome of Bruynswyke. folio.
LONDON. Peter Treveris 1525 (13434)

—— The vertouse boke of distillacyon of the waters of all maner of herbes. folio.
LONDON. Laurens Andrewe 1527 (13435)
Other editions.
LONDON. L. Andrewe (1528?) folio. (13436)
LONDON. P. Treveris? (1530?) folio. (13437)

—— A most excellent and perfecte homish apothecarye or homely physick booke for all the grefes and diseases of the bodye. Translated out of the Almaine speche into English by Ihon Hollybush. folio.
COLLEN. (Cologne) A. Birckman 1561 (13433)

BROADSIDE.

The description of a moste dreadfull and mervelous Monster borne in Manchester within the county of Lancaster upon Tusdaye being the fourtenth of August last past 1579. Large folio.
LONDON. For Toby Coke (1579)

BULLEIN, William d. 1576.

A newe boke intituled ye government of helthe, wherein uttered many notable rules for mens preseruation, with sundry simple and other matters, no lesse fruitful then profitable . . . . collect out of many approued authors. Reduced into the forme of a dialogue, for the better understanding of the learned. 8vo.
LONDON. Ihon Day 1558 (4039)
Other editions.
LONDON. Ihon Day 1558 8vo. (4040) Has an altered title "A Newe Boke of phisicke etc."

LONDON. Ihon Day 1559 8vo. (4041)
LONDON. V. Sims 1595 8vo. (4042) Altered title "The government of health etc."

—— Bulwarke of defence againste all Sicknes, Sornes, and woundes that dooe daily assaulte mankinde, whiche Bulwarke is kepte with Hilarius the Gardiner, Health the Phisician, with their Chyrurgian, to helpe the wounded soldiors. Gathered and practised from the moste worthie learned, both old and new: to the greate comforte of mankinde; Doen by Willyam Bulleyn and ended this Marche Anno Salutis 1562. folio.

LONDON. Ihon Kyngston 1562 (4033)
Another edition.
LONDON. T. Marshe 1579 folio. (4034)

—— A comfortable regiment and very wholsome order against the most perilous pleurisie, whereof many doe daily die within this citie of London and other places. 8vo.

LONDON. J. Kingston 1562 (4035)

—— A dialogue bothe pleasaunte and pietifull wherein is a godly regimente against the feuer pestilence, with a consolacion and comfort against death. Newly corrected by Willyam Bulleyn the author thereof. 8vo.

LONDON. Ihon Kingston 1564 (4036)
Other editions.
LONDON. Ihon Kingston 1573 8vo. (4037)
LONDON. Ihon Kingston 1578 8vo. (4038)

—— A briefe and short discourse of the vertue and operation of Balsame, with an instruction for those that have their health to preserve the same. Whereunto is added Doctor Bulleins diet for health. 8vo.

LONDON. For J. Perin 1585

C. . . . . G.

(may be CARLETON, George Bishop of Chichester 1559-1628). A treatise of mathematicall phisicke, or briefe introduction to phisicke, by judiciall astronomy. Intreating very exactly and compendiously of the natures and qualities of all diseases incident to humane bodyes by the naturall influence of the celestiall

motions. Neuer before handled in this our native language, written by G. C. gent. Practicioner in phisicke. 4to.

LONDON. T. Purfoot 1598 (6276)

This item is added to DARIOT, Claude "A brief introduction to astrologicall judgment of the stars."

C.....T

An hospitall for the diseased. 4to.

LONDON. For E. White 1579 (4304)

Other editions.

LONDON. For E. White 1587 4to. (4305)
LONDON. J. Roberts for E. White 1595 4to. (4306)
LONDON. E. Allde for E. White 1598 4to. (4307)
LONDON. G. Purstowe for E. White 1619 4to. (4308)
LONDON. For R. Bird 1630 4to. (4309)
LONDON. J. Beale for R. Bird 1633 4to. (4310)

CAIUS, John 1510-1573.

A boke or counseill against the disease commonly called the sweate or sweatyng sicknesse. Made by Ihon Caius doctour in phisicke. Very necessary for euerye personne, and muche requisite to be had in the handes of al sortes, for their better instruction, preparacion and defence, against the soubdein comyng, and fearfull assaultyng of the same disease. 8vo.

LONDON. Richard Grafton 1552 (4343)

CARY, Walter

A briefe treatise called Caries farewell to Physicke wherein are to be found diverse rare and speciall helps for manie ordinarie diseases. 8vo.

LONDON. H. Denham 1583 (4730)

Other editions.

LONDON. H. Denham 1587 8vo. (4731)
LONDON. Company of Stationers 1611 12mo. (4732)

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VENICE. J. Gryphius 1551 (20779)

RECORD, Robert 1510-1558.

The urinal of phisicke. Composed by Maister Robert Record, Doctor of Phisicke. 8vo.

LONDON. R. Wolfe 1547 (20816)

Other editions.

LONDON. R. Wolfe 1548 8vo. (20817)
LONDON. R. Wolfe 1567 8vo. (20818)
LONDON. Thomas Dawson 1599 8vo. (20819)
LONDON. For G. D. 1665 8vo.

REMEDIES

Present remedies against the plague. 4to.

LONDON. For W. Barley 1594 (20867)

Another edition.

LONDON. For T. Pavyer 1603 5to. (20868)

ROESSLIN, Eucharius d. 1526.

The byrth of mankynde newly translated out of Laten into Englysshe (by Richard Jonas). 4to.

LONDON. Imprynted by T. R. (Thomas Raynalde) 1540 (21153)

—— The byrth of mankynde . . . translated by Thomas Raynalde, phisition. 4to.

LONDON. Thomas Ray 1545 (21154)

Other editions.

LONDON. Thomas Ray 1552 4to. (21155)
LONDON. R. Jugge 1560 4to. (21156)
LONDON. R. Jugge 1561? 4to.
LONDON. R. Jugge 1564? 4to.
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LONDON. For A. Helme 1634 4to. (21164)
LONDON. For John Legat 1654 4to.

SAINT BARTHOLOMEW'S HOSPITAL

The ordre of the Hospital of S. Bartholomewes in westsmythfielde. 8vo.

LONDON. R. Grafton 1552 (21557)

SCHILANDER, Cornelius

C. Shilander his chirurgerie containing a briefe methode for

the curing of woundes and ulcers. With an easie maner of drawing oyle out of wound-hearbes, terpentine . . and waxe. Translated out of Latin into English by S. Hobbes. 4to.

LONDON. R. Johnes for C. Burbie 1596 (21817)

SECURIS, John

A detection and querimonie of the daily enormities and abuses committed in physick. 8vo.

LONDON. Thomas Marshe 1566 (22143)

SKEYNE, Gilbert 1522-1599.

Ane breve descriptioun of the pest quhair in the causis, signis, and sum speciall preseruation and cure thair of are contenit. Set furth be Maister Gilbert Skeyne, Doctoure in Medicine.

EDINBURGH. Robert Lekprevik 1568

T..... A

A rich storehouse or treasury for the diseased, wherein are many approved medicines for divers and sundry diseases not come to light before this time. Now set foorth for the great benefit and comport of the poorer sort of people by A. T. 4to.

LONDON. For T. Purfoot and R. Blower 1596 (23606)

Other editions.

LONDON. (1600?)
LONDON. R. Blower 1607 4to. (23607)
LONDON. R. Blower 1612 4to. (23608)
LONDON. R. Blower 1616 4to. (23609)
LONDON. R. Badger 1630 4to. (23610)
LONDON. R. Badger 1631 (23611)

TREASURE The

Here begynneth a newe boke of medecynes intytulyd the treasure of pore men. 4to.

LONDON. R. Banckes (1526?) (24199)

Other editions.

LONDON. R. Redman 1539 8vo. (24200)
LONDON. T. Petyt 1539 8vo. (24201)
LONDON. T. Petyt 1540 8vo. (24202)
LONDON. T. Colwel (1540?) 8vo.
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LONDON. J. Waley n. d. 8vo. (24205a)
LONDON. T. Colwell (1560?) 8vo. Two issues (24206 and 24206a)
LONDON. T. Colwell (1562?) 8vo.
LONDON. T. Colwell 1575 8vo. (24207)

TURNER, William 1510-1568.

A booke of the natures and properties of the bathes in Englande. folio.

COLLEN. A. Birckman 1562 (24351)

URINES

The judycyall of uryns; consydernynge that it is expedyent for euery man to know the operation and qualities of his body and to know in what state and condicyon his body standeth in whiche can not be knowen so well as by the uryne. In consyderation whereof this worke is collected and gadered out of ye sentencyals sayngis of al Auctours of phisicke to the entent that euery man myght brefly come to the knolage of ye pmisses whiche sayd worke is diuided into iii seuerall bokes . . . folio.

Wynkyn de Worde, 1512, or Peter Treveris, ca. 1527 (14836)

—— Here begynneth the seynge of uryns of all the coloures that urynes be of, with the medycines annexed to euery uryne and to euery uryne his urynall much profitable for euery man to knowe. 4to.

LONDON. R. Banckes 1525 (22153)

Other editions.
LONDON. R. Bankys 1526 4to. (22153a)
LONDON. R. Wyer (1530?) 8vo. (22153b)
LONDON. (R. Redman 1540?) 8vo. (22154)
LONDON. Elysabeth late wyfe unto R. Redman (1541?) 8vo. (22155)
LONDON. W. Myddleton 1544 8vo. (22156)
LONDON. W. Powel 1548 8vo. (22157)
LONDON. A. Kitson (1550?) 8vo. (22158)
LONDON. Ihon Waley (1550?) 8vo. (22159)
LONDON. John Waley (1555?) 8vo. (22160)
LONDON. W. Powel 1562 8vo. (22161)

—— Hereafter foloweth the Judgment of all Urynes: And for to knowe the mannes form the womannes, and beastes both from the mannes & womannes, with the coloure of euery uryne.

Exercysed & practysed by Doctor Smyth, and other at Mountpyller, with dyverse other. 8vo.

LONDON. Robert Wyer circa 1540 (14834)

VASSEUS, Joannes 1486-1550.

Here beginneth a litil treatise conteyninge the jugement of urynes most necessary for al such as be desirouse to knowe the state of their owne bodys. Wrytyn in the latyn tong and englished by H. Lloyd. 8vo.

LONDON. R. Tottyl 1553 (24595)

VICARY, Thomas 1490?-1561.

A profitable treatise of the anatomie of mans body: compyled by that excellent chirurgion M. Thomas Vicary esquire, Seriaunt chirurgion to King Henry the eyght, to King Edward the vj, to queene Mary, and to our most gracious Soueraigne Lady Queene Elizabeth, and also cheefe chirurgion of S. Bartholomewes Hospital. Which work is newly renyued, corrected and published by the chirurgions of the same Hospital now being An. 1577. 12mo.

LONDON. Henry Bramforde 1577 (24713)

This is the earliest edition now extant. The original edition of 1548 although known to be printed is now completely lost.

—— The Englishmans treasure, or treasor for Englishmen; with the true anatomy of mans body; whereunto are annexed many secrets appertaining to chirurgery. 4to.

LONDON. (1585?) (24706)

Other editions.
LONDON. John Windet for John Perin 1586 4to. (24707)
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LONDON. T. Creede 1596 4to. (24709)
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LONDON. B. Alsop and T. Fawcet 1626 4to. (24711)
LONDON. B. Alsop and T. Faucet 1633 4to. (24712)
LONDON. B. Alsop 1641 4to.
LONDON. F. Fawcet 1651 4to.

VIGO, Joannes de

This lytell practyse of J. de Vigo in medycyne is translated out of Laten into Englysshe for the helth of the body of man. 4to.

LONDON. Robert Wyer (1535?) (24724)

Other editions.
LONDON. Robert Wyer (1541?) 8vo.
LONDON. Robert Wyer (1550?) 8vo. (24725)
LONDON. A. Kitson 1564 8vo. (24726)

—— The most excellent workes of Chirurgerye, made and set forth by maister John Wigon, heed Chirurgien of our tyme in Italie, translated into english. Whereunto is added an exposition of straunge termes and unknowen symples, belonging to the arte. folio.

LONDON. Edwarde Whytchurch 1543 (24720)

Other editions.
LONDON. Edwarde Whytchurch 1550 folio. (24721)
LONDON. T. East and H. Middleton 1571 (24722)
LONDON. T. East 1586 4to. (24723)

W..... I

Copie of a letter . . . by a learned physician . . wherein are detected the errors of the apothecaries in preparing their compositions. 8vo.

(LONDON. 1586?) (24906)

WATESON, George 1544-1587.

The cures of the diseased in remote regions. Preventing mortalitie, incident in forraine attempts of the English nation. 4to.

LONDON. F. Kingston for H. Lownes 1598 Two issues (25106 and 25106a)

WECKER, Hans Jacob 1528-1586.

A compendious chyurgerie gathered and translated especially out of Wecker at the request of certaine, but encreased and enlightened with certaine annotations, resolutions and supplyes

not impertinent to this treatise nor unprofitable to the reader . . . published by I. Banester. 12mo.

LONDON. J. Windet for T. Man 1585 (25185)

Another edition.

LONDON. J. Windet for J. Harrison 1585 (25185a)

WINGFIELD, Henry

A compendious or short treatise, gathered out of the chyefe and principall authors of phisycke, conteynynge certeyne preceptes necessary to the preseruation of healthe and longe continuance of the same; verye pleasaunte and profitable to reade. 8vo.

LONDON. Robert Stoughten (1551?) (25852)

WIRTZUNG, Christopher 1500-1571.

Praxis medicinae universalis, or a generall practise of physicke. Wherein are conteined all inward and outward parts of the body, with all the accidents and infirmities that are incident unto them, even from the crowne of the head to the sole of the foote, also by what means (with the help of God) they may be remedied . . . . . translated into English . . . . . by Jacob Mosan. folio.

LONDON. Edmund Bollifant 1598 (25862)

Other editions.

LONDON. E. Bollifant imp. George Bishop 1598 folio. (25863)

LONDON. R. Field imp. George Bishop 1605 folio. (25864)

LONDON. J. Legat for Thomas Adams 1617 folio. (25865).

ACKNOWLEDGMENTS

" I have gathered a posie of other men's flowers and nothing but the thread which binds them is mine own." And therefore the author owes much to many people. The backbone of this article has been made from those two indispensable books of reference, Pollard and Redgrave's *Short Title Catalogue* and the British Museum's *Catalogue of English Books printed up to 1640*. To the careful editing, collation and annotation of items in all the many booksellers' catalogues the author owes more than he can tell. Much of the knowl-

edge of editions and the expansion of titles has come from this source. Items and editions have been noted in the catalogues of the large medical Libraries, both private and public.

The illustrations are taken from the *John Rylands Facsimiles No. 3* and W. Blades *The Biography and Typography of William Caxton.*

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THE STUDY OF THE HISTORY OF MEDICINE IN RUSSIA

An Historical Outline *

D. M. ROSSISKI

Knowledge of the historical development of the medical and natural sciences is very important for the study of these sciences. Not much attention was paid to the problems of medical history, to its study and instruction, in the medical faculties of the Russian universities before the Revolution.

According to our records, instruction in the history of medicine was given for the first time in the Medical Faculty of the University of Moscow in the beginning of the nineteenth century. From 1807 to 1810 Professor Coritari was in charge of giving instruction in the subject " from his own notes," and after his death Vanotti gave the course of medical history at the Moscow University during a period of two years, from 1810 to 1812, that is, before Napoleon's invasion of Russia.

The instruction that had been interrupted by the Patriotic War of 1812 was resumed at the Medical Faculty of the University of Moscow in 1813. In the *Description of the Solemn Restoration and Consecration of the Medical Faculty in the Imperial University of Moscow that took place on October 13, 1813, published by the Dean of the Medical Division, Matfiei Mudrovi, 1814, at the University Press,*[1] in the section, *Condition of the Medical Division of the Imperial University of Moscow at the end of 1813 and the beginning of 1814*, mention is made of a Doctor of Medicine, Professor of Pharmacy, of Materia Medica and History of Medicine, Vasili Kotelnitski.

It seems that the professors of the Medical Faculty of Moscow paid

* Translated by Henry E. Sigerist from an original manuscript.

[1] Описание торжественного обновления и освящения медицинского факультета в Императорском Московском Университета, совершившагося Октября 13-го дня 1813, изданное деканом врачебного отделения Матфием Мудровым, 1814. В Университетской Типографии.

great attention to the study of the history of medicine. This is evidenced by the fact that in the first Russian scientific medical society founded in 1804 at the University of Moscow as the *Society of Emulation of the Medical and Physical Sciences*, later named the *Physico-medical Society*, much work was devoted to the history of Russian medicine under the leadership of the president of the Society, V. M. Richter. The beginning of the publication of the *History of Medicine in Russia*, undertaken by Professor Richter and published by the Society, came in the year 1811, and during the course of 1811 and 1812 he published two volumes of the book. In a report on the work of the Moscow Physico-medical Society printed in the third part of its *Medico-physical Journal* for the year 1821, there is the following statement:

> The endless number of historical records, most of which are preserved in Moscow, seemed to promise to the diligent researcher an abundant crop of memorable facts which, once they were collected carefully, would present an historical picture of the beginning and development of the healing art and its subsidiary disciplines—a picture that would be extremely interesting to all who love science and the Fatherland.
>
> Our most venerable and most diligent President has taken this very difficult task upon himself. Single-handed but with the assistance of young people such as ordinarily attend society meetings, who analyzed for him innumerable books and manuscripts, he completed in the course of a few years the most important and most difficult part of his work, two volumes of which have already been published at his own expense. In addition to this he gave the Society the pleasure of sharing in the fruits of his labors, in that he presented before it many papers which he read in the General Meetings namely:
>
> 1. First outline of a History of Medical Science in Russia from the earliest times to Peter the Great [January 7, 1811].
> 2. History of obstetrics[2] in Moscow.
> 3. A historico-chronological study of plagues that befell Russia repeatedly, from the beginning of the 9th to the 16th century [May 6, 1811].
> 4. History of the childbed, of the ensuing diseases, of the treatment and departure of Grand Duchess Sophia, wife of Grand Duke Alexis Petrovich in 1715 [September 9, 1811].
> 5. A study of the relations between the ancient Russians and Greeks and of the incorrectness of the view that medicine had come to Russia together with physicians from Greece [the same day].

[2] The Russian term at the time was повивальное искусство, art of delivery, corresponding to the German term Entbindungskunst.

6. Remarks on the early condition of pharmacy in Russia [February 3, 1812].

7. The first period of the History of Medicine in Russia, before the tenth century.

During the presidency of Professor V. M. Richter, the Society acquired a collection of valuable old medical books and rare medical manuscripts. All records of the history of medicine existing in Russia were made available to the Society, and it was given full freedom to make use of these sources.

Outside the Medical Faculty of the University of Moscow instruction in the history of medicine in the first half of the nineteenth century, before 1845, was organized in Moscow in the Medico-Chirurgical Academy, which had made its appearance as a branch of the Military Medical Academy of St. Petersburg, and in that medical institution, which had the highest scientific standard, the teaching of the history of medicine was not handled as a separate independent subject, but entered every discipline as an integral part of it.

In the course of the nineteenth century, conditions of instruction in medical history underwent a number of changes. Under the University Statute of 1835 the history of medicine was combined in one chair with the literature and encyclopedia of medicine, medical policy and forensic medicine; and under the Statute of 1863, history and encyclopedia of medicine were taught together with general therapeutics and diagnostics. It was only under the Statute of 1884 that an independent chair of the history and encyclopedia of medicine was established at last in the faculties of medicine. It must be remarked, however, that this chair in the more than thirty years of its existence was not filled once with a full professor. The course in the history of medicine was given either by a lecturer (privat-dozent), or by the professor of any other chair, and the amount of money assigned to the chair of medical history was spent for other departments.

In sharp contrast to the unsatisfactory teaching of medical history in the medical faculties, instruction in the subject was organized in an infinitely better way in the St. Petersburg Military Medical Academy, in that the chair of the History of Medicine created in the Academy

ten years later than in the medical faculties was filled from the very beginning by Professor G. G. Skorichenko, who for ten years gave a course of medical history to the students of the Academy.

In the Medical Faculty of the University of Moscow, medical history was taught under the edict of 1884 by M. A. Belin, prosector in forensic medicine, who gave the course of medical history from 1871 to 1896. He was the author of *Notes on the History of Medicine* published in 1889, which presented an outline of the development of medicine "from the civilizations of antiquity to the period of the Renaissance."

After Belin the well-known physiologist, L. Z. Morokhovets, conducted instruction in medical history in the Moscow Medical Faculty and did much to improve teaching in the field. In 1903 he published a textbook of medical history for students under the title *History and Correlation of the Medical Sciences.* Together with Professor M. Yu. Lakhtin he published two volumes of *Studies of the Department of the History and Encyclopedia of Medicine,* and endeavored to found a museum of medical history at the University of Moscow.

A great part in the development of research and instruction in medical history was played by Professor M. Yu. Lakhtin, the author of a large number of scholarly studies in the field, who for many years gave a course on the history of Russian medicine at the University of Moscow, and who in 1920 became the occupant of an independent chair of the history of medicine in the Medical School in Moscow.

At the present time, chairs of the history of medicine are being created in all higher medical institutions of the USSR.

The foundation of special medical history clubs in the medical schools contributes a great deal to deepening the study of the subject. Thus in 1944 we organized such a club at the First Moscow Medical Institute, in which we studied the history of medical disciplines and the part played in medicine and the significance of prominent Russian and foreign scientists; particular attention was paid to the study of the development of Russian medicine.

A series of papers and communications presented at the meetings of the club were devoted to the history of the development of Russian

medicine in the 17th, 18th and 19th centuries. Special conferences were held in commemoration of the 200th anniversary of the birth of the famous Russian obstetrician and phytotherapist, N. M. Ambodik, and of the centenary of the birth of the outstanding Russian clinician, A. A. Ostroumov—one of the pioneers of our national schools of clinical medicine.

In order to broaden the knowledge of the national history of medicine, the president of the Medical History Club, Professor D. M. Rossiski, gave lectures to the students of the First Moscow Medical Institute on the outstanding medical workers of this oldest institution of higher medical learning in the USSR, in which he discussed the significance for Russian medicine of such famous physicians as Zakharin, Botkin, Ostroumov, Pirogov, Sechenov, Kozhevnikov, Korsakov, Snegirev and others.

On December 6-8, 1944, a special conference on the history of Russian medicine was held at the First Moscow Medical Institute at which Professor Rossiski presented a paper on "The Russian clinical schools."

The following papers were read at the meetings of the Medical History Club during the year 1944-1945:

Prof. D. M. Rossiski:

Nestor Maksimovich Ambodik, on the 200th anniversary of his birth.
The first Russian endocrinologists.
The founder of Russian phytotherapy: Prof. N. M. Ambodik.
The founder of Russian clinical medicine: Prof. A. A. Ostroumov.
The pride of our national science—on the 180th anniversary of the death of Mikhail Vasilevich Lomonosov.
Louis Pasteur—on the 50th anniversary of his death.
Russian medical periodicals in the 18th century.
The first Russian scentific medical journal.

L. A. Turubiner:

The first Russian medical students.

Prof. A. V. Reisler:

Sanitary-hygienic regulations in the food industry in the 16th and 17th centuries.

Prof. M. A. Egorov:

Centenary of the publication of the first paper on Basedow's disease.

Prof. S. S. Steriopulo:
Recollections about Prof. A. A. Ostroumov.

Prof. D. M. Shcherbachev:
A contribution to the history of phytotherapy.

Prof. D. A. Burmin:
Prof. A. A. Ostroumov, the first director of the hospital medical clinic of the University of Moscow.

V. A. Ryumin:
Materials for the history of Russian medicine in the 16th century.

M. F. Levi:
On folk obstetrics in Russia, historical materials.

The students of the First Moscow Medical Institute also took an active part in the work of the Medical History Club. At the scientific conferences two papers were presented by a student, M. P. Kalashnikova, namely, "History of the first medical schools in Russia" and "Pirogov's student days."

The organization of similar medical history clubs in other medical schools and the founding of much larger organizations for the study of medical history—societies of the History of Medicine—will undoubtedly greatly contribute to a progressive development of this most interesting and very important medical discipline.

In 1946 a Historical Section was organized in the Moscow Medical Society, the oldest scientific society of specialists of internal medicine in our country. Under the chairmanship of Prof. Rossiski the Section is working on a study of the history of internal medicine and of the significance of outstanding Russian and foreign scientists for the development of this specialty. Particular emphasis is placed on the study of the history of Russian internal medicine. At the last sessions of the section, the following papers were presented:

Prof. D. M. Rossiski:
The first Russian scientific medical society.
Studies in internal medicine published in physicians' journals and scientific medical periodicals of the 18th and early 19th centuries.

Prof. P. E. Zabludovski:
Paracelsus, a great physician of the Renaissance.

Prof. G. M. Popov:
The scientific foundations of war medicine in the first half of the 19th century.

Very important for the study of medical history is also the fact that our national medical journals devote special sections to papers on medical history. It should be singled out that the first journals that did this were *Vrachebnoye Delo* and *Russkaya Klinika*. As early as 1926 *Vrachebnoye Delo* undertook to publish papers and reviews on medical history. Another large national medical journal, *Russkaya Klinika*, upon our initiative as chief editor, allotted a special section to medical history and published as leading article in every number a review or an original article on some subject of medical history.

The journals *Klinicheskaya Meditsina, Sovetskaya Vrachebnaya Gazeta*, and *Sovetskoye Zdravookhraneniye* also have begun to publish articles on medical history.

The number of works on medical history written by our compatriots is relatively quite considerable, as can be seen from a bibliography of the Russian medico-historical literature during the century and half during which there was a Russian medical literature, namely, D. M. Rossiski, *A bibliographical index of the Russian literature in the history of medicine from 1789 to 1928*, Moscow, 1928.[3] In this book 1325 titles are listed; it does not include works that have no immediate relation to the history of medicine, although it contains some biographical sketches and obituaries of scientists who either were significant for the history of medicine or for the part they played or for the interest in the history of medicine recorded in these biographies and obituaries.

Today an *Institute of the Organization of Health Services* has been founded in the Academy of Medical Sciences of the USSR with a *Division of the History of Medicine* that includes sections of general medical history, of the history of Russian medicine before Peter the Great, of the history of Russian medicine in the 18th and 19th centuries, of the history of Russian medicine in the 20th century and of Soviet medicine; and thus the study of the history of medicine will develop more and more in our country in depth as in breadth.

[3] Д. М. Российский: Библиографический указатель русской литературы по Истории Медицины с 1789 до 1928 г. Москва. 1928 г.

AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE

The twenty-first Annual Meeting of the Association will be held in Philadelphia on May 26-27, 1948. Since this date immediately precedes the Fiftieth Anniversary Meeting of the Medical Library Association which is being held in Philadelphia on May 28-30, 1948, each of the Associations has extended an invitation to members of the other to attend all of its sessions. Dr. Richard H. Shryock, President of our Association, has received the following letter from Mrs. Eileen R. Cunningham, President of the Medical Library Association:

November 28th, 1947

Dear Dr. Shryock:

I have learned that the American Association of the History of Medicine will hold its next annual meeting in Philadelphia on May 26th and 27th.

As the Fiftieth Anniversary of the Medical Library Association is also to take place in Philadelphia beginning May the 28th, it makes me very happy to be able to extend a cordial invitation to all members of your Association to attend any and all sessions of our meeting including the Annual banquet.

I feel that the members of our two Associations have many mutual interests, and it is with the greatest of pleasure that I extend this invitation, and am delighted that the continuity of time and place makes it possible to do so.

Sincerely yours,

Eileen R. Cunningham, President

The Meeting will be held at the College of Physicians with the following tentative time-schedule of activities:

Wednesday, May 26:	
10–12:30	First general session
12:30–2	Luncheon
2–3	Garrison Lecture
3–4	Committee meetings and exhibits of the College of Physicians
4:30	Tea (or similar entertainment)
8	Second general session
Thursday, May 27:	
9–12:30	Meeting of the Council and Business meeting
12:30–2	Luncheon
2–5	Third general session
7	Dinner session

Forty double rooms have been reserved for members of the Association at the Penn Sheraton Hotel. Members wishing to make reservations should contact the hotel directly, addressing their application to Mr. Michael McGarry and mentioning the American Association of the History of Medicine.

Information regarding the program may be obtained from the Chairman of the Program Committee, Dr. Owsei Temkin, 1900 E. Monument St., Baltimore 5, Md. The final program will be announced later.

Dr. Shryock has appointed a Nominating Committee composed of the following members: Dr. W. F. Norwood, Chairman, Dr. Erwin H. Ackerknecht, Dr. Chauncey D. Leake, Dr. Esmond R. Long, Dr. Robert E. Schlueter.

NATIONAL NEWS

Army Medical Library

The Library has initiated a series of exhibits on Famous Men of Army Medicine, the first being devoted to Dr. William Beaumont, U. S. Army Surgeon who made a significant contribution to the physiology of digestion in the early part of the 19th century. His book, *Experiments and Observations on the Gastric Juice and the Physiology of Digestion* (Plattsburgh, N. Y., 1833) and a member of interesting photographs are included in the exhibit.

New York, N. Y.

The Section on Historical and Cultural Medicine of the New York Academy of Medicine devoted its meeting on November 12, 1947 to a discussion of "Medicine under the Dictators." The following program was presented:

"Medicine under Mussolini." Mario Volterra

"Medicine under Hitler." George Rosen

"Medicine in Contemporary Spain." Julio Alvarez del Vayo

There was a further discussion by Franz L. Neumann and Max Ascoli.

NEWS FROM ABROAD

Edinburgh, Scotland

On November 4, 1947 the University of Edinburgh celebrated the Centenary of the discovery of chloroform anaesthesia by Sir James Young Simpson, who was Professor of Midwifery there from 1830 to 1870. The celebration included a scientific meeting to discuss the use of chloroform today, a special graduation in the Old College, at which the LL. D. degree was conferred on Dr. Henry Walter Featherstone, O. B. E., founder-president of the Association of Anaesthetists of Great Britain, and on Sheriff Thomas Blantyre Simpson, K. C., a grand-nephew of the discoverer of chloroform anaesthesia. This was followed

by a luncheon in the Senate Hall of the Old College where Sir John Fraser, Principal and Vice-Chancellor of the University, presided. During the luncheon a toast to "Sir James Y. Simpson and Chloroform" was submitted by Professor-Emeritus R. W. Johnstone.

In the afternoon at a reception in the Upper Library of Edinburgh University, Dr. Douglas Guthrie, Lecturer on the History of Medicine in the University, gave a short address on "The Discovery of Chloroform Anaesthesia." Dr. Guthrie had prepared an interesting exhibit of Simpson relics for the occasion, and the University published a brochure containing Simpson's portrait and a description of his discovery.

On the morning of this same day wreaths from the President and Fellows of the Edinburgh Obstetrical Society and from Simpson's descendants were laid at the base of the Sir James Young Simpson statue in West Princes Street Gardens. The Centenary celebration was attended by several foreign visitors, among whom was Dr. John F. Fulton of Yale University.

Liber Regulae S. Spiritus (Regola dell'Ordine Ospitaliero di S. Spirito). Testo e commento a cura di A. Francesco La Cava. *Studi di Storia della Medicina*, diretti da N. Latronico, vol. VI. Milano: Ulrico Hoepli, 1947. 218 pp., 62 plates. Lire 1000.[1]

There is still much poverty today, even in economically very advanced countries. We, however, do not accept the fact as a matter of course but feel very much ashamed about it. We talk of abolishing poverty, and we are making great efforts to raise the standard of living of the population. It is not a Utopian dream when we think that the time is not too far off when in a civilized society the only poor people will be the feebleminded who are unable to work, and of these society could easily take care. This is not Utopian, because we have the scientific and technical means to produce the food and commodities that all people require. What we need is a social organization that permits equitable distribution—and peace; still a lot, but these are all problems that could be solved with intelligence and good will.

Conditions were totally different in the past. In the static world of the Middle Ages poverty was an accepted status. People were born poor or rich and usually remained so. Society had not the means even to dream of changing conditions. Agricultural and industrial production was such that it could not possibly satisfy the needs of the entire population, and means of transportation were so slow that every crop failure was a catastrophe that hit the poor particularly hard and increased their ranks.

Thus in the Middle Ages society had to reckon with a large number of persons without property who had to be taken care of in some way, if they were not to become a potential menace to the existing order. In the country the lord of the manor was responsible for the welfare of his people. The church took an active hand in alleviating suffering. While it had become a temporal power itself and by far the greatest owner of property, it glorified poverty and made it the duty of the Christian to help the poor. And since the sick pauper was the most pitiful of all, having no chance to make a bare living either through work or begging, particular attention was paid to him.

Infirmorum cura ante omnia adhibenda est, was written in the constitution of the Benedictine Order as early as the sixth century A. D., and it is well know how Benedictine monasteries had infirmaries for the sick. In the following centuries special orders were founded for the nursing of the sick, most famous of which were the Knights Hospitallers of St. John of Jerusalem, the Teutonic Order, the Order of St. Lazarus that nursed the lepers, the Antonites who attended primarily to the victims of ergotism, the Trinitarians who

[1] Lire 1000 was about $1.50 in September 1947.

endeavored to liberate Christians captured by the Moslems (and who had hospitals also), and many others.

Among these orders one of the most influential, without any doubt, was the Order of the Holy Ghost that led to the creation of hundreds of hospitals all over the Western world. Two individuals determined the course of its history, Guy of Montpellier who founded it in France around 1170 and Pope Innocent III (1198-1216) who brought the still obscure Order to Rome. Rome at that time was a small devastated city of hardly 35,000 people of whom, it was said, *paucos Romae suo tempore ad quadraginta, paucissimos ad sexaginta pervenisse*, few reached the age of 40 and very few the age of 60. A new hospital was therefore more than needed, and the Hospital of the Holy Ghost was built between 1198 and 1201. The seat of the Order was transferred from Montpellier to Rome; Guy became the first rector of the new hospital, the name of which was in the beginning Hospital of S. Maria in Saxia after a little church annexed to it, until it became the Ospedale di Santo Spirito in Saxia in 1207, recording thus the name of the Order, and finally the Arcispedale di Santo Spirito, Rome's most important hospital and the prototype of other institutions of the Order. Other foundations followed in rapid succession. In 1198 the Order had seven houses in France and two in Rome. Then followed Zurich in 1207, Vienna in 1208, Halberstadt in 1209, Cracow in 1220, and by the end of the century Europe had a large number of Holy Ghost hospitals.

The Constitution of the Order, the Latin text of which is published here in full for the first time,[2] is preserved in the State Archives of Rome in a beautiful illuminated vellum manuscript of the beginning of the 15th century (MS. 3193). It obviously is not the original, but a copy, and it is not the first constitution of the Order but one that was revised and amplified in the 13th century after the foundation of the Roman hospital. It has 105 chapters, many of which have extensive contemporary commentaries, and is an important document in that it gives us a good picture of the functioning of a later mediaeval hospital at the time when the transition took place from the early mediaeval xenodochium to the hospital in the more modern sense of the word. The Constitution deals not only with the welfare activities of the Order but regulates all aspects of the life of the men and women who joined the Order to lead a life of obedience, chastity and poverty, one that was primarily devoted *ad curam et servitium pauperum*.

In the 13th century the Hospital of the Holy Ghost in Rome had 300 beds and in addition assisted 1000 people a day in what we might call its outpatient department. The Constitution required the Order not only to admit the sick poor who came to the hospital, but to go out and look for them in

[2] An early incomplete edition was published by B. Cirillo, *Regula Ordinis S. Spiritus*, Rome, 1564; reprinted in Migne, *Patr. Lat.* vol. 217, col. 1137-1156, Paris, 1890.

the streets once a week and to bring them to the hospital on a stretcher on wheels that may be considered an early type of ambulance.[3] Spiritual health came first, and the patient upon entering was required to confess first and to take Holy Communion before he was put to bed. The sick were received *quasi domini*, like patrons, and were served their food first before the brothers got theirs. Their heads were washed every Tuesday, their feet every Thursday by the sisters.

Such a hospital was a regular welfare centre. In addition to sick rooms it had a maternity home with a separate cradle for every infant, a brephotrophium for foundlings, an orphanotrophium for orphans, a gerontocomium for old people, a pavilion for noblemen who wished to retire to such a place because they were old and sick and had no relatives to look after them, a leprosarium, and even a kind of rehabilitation centre. The Constitution, for example, foresaw that prostitutes who wished to do so, might retire to the hospital for a couple of weeks at the time of Easter, and it was hoped that some would repent after such a period of retreat.

La Cava believes that the members of the Order during the first centuries possessed the medical knowledge of the day and actually practised medicine on the inmates of the hospital. This is possible, although I am not convinced of it. They were required to give the sick *curam diligentissime*, but *cura* may be both treatment or simply care. A more important argument is that physicians are never mentioned in the early history of the Roman hospital; they seem to be taken for granted at that time, while they are mentioned later.

The Roman Hospital was the prototype that was copied by other hospitals of the Order. It remained a famous institution to our day. In the 16th century it had a renowned pharmacy which in the following century played an important part in the distribution of cinchona. In 1714 Lancisi's library was added to the Hospital, today a precious historical collection of over 10,000 printed volumes and many manuscripts and incunabula. An anatomical museum followed, and the Hospital was the first teaching hospital of Rome. It was a centre of medical research from the time of Leonardo da Vinci to the present time, and recently the museum of the Accademia di Storia dell'Arte Sanitaria was housed in it.

The *Regula S. Spiritus* is in no way unusual but follows rather closely the pattern of the constitution of the Knights Hospitallers of Saint John of Jerusalem, which in turn is based on the rules of earlier orders. Its great interest lies in the fact that it with its 105 chapters and commentaries is very detailed. Dr. La Cava has not only given an edition of the text, but has analyzed it carefully and has discussed its place in the history of medicine. In the first part of the book he also gives a very good outline of the history of the Order. The book thus becomes an important contribution to the

[3] There is a picture of it, fig. 30.

history of the Western hospital which is enhanced by the 62 full-page plates reproducing miniatures from the manuscript.

We hear that Dr. La Cava is preparing at the moment a comprehensive history of the hospital and is also working on two Arabic manuscripts that deal with the plague.

His present book is volume VI of a series published by the School of the History of Medicine of the University of Milan under the editorship of Professor N. Latronico. Since the series was launched during the war and is little known in the United States, I am listing the various titles which will be reviewed in the course of time:

1. A. Bottero, *La chirurgia del polmone attraverso i tempi.* 198 pp. L.400.—
2. A. F. La Cava, *La peste di S. Carlo vista da un medico.* 240 pp. L.400.—
3. A. F. La Cava, *Igiene e sanità negli Statuti di Milano del sec. XIV.* 100 pp. 1945. L.250.—
4. N. Latronico, *I vini medicinali nella storia e nella scienza.* 250 pp. L.400.—
5. G. Padovani, *La stampa periodica italiana di Neuropsichiatria e Scienze affini, nel primo centenario di sua vita.* 120 pp. L.200.—
6. A. F. La Cava, *Liber Regulae S. Spiritus* (Regola dell'Ordine Ospitaliero di S. Spirito). 218 pp., 62 plates. L.1000.—
7. A. F. La Cava, *La dietetica romana in Aulo Cornelio Celso.* 150 pp. L.250.—

HENRY E. SIGERIST

T. G. WILSON. *Victorian Doctor, Being the Life of Sir William Wilde.* New York: L. B. Fischer [1946]. 336 pp. Illustrated. $3.50.

The name of Sir William Wilde is encountered in biographies of his son, Oscar Wilde. Usually many words are devoted to his eccentricities and moral shortcomings, and too little is said of his accomplishments. The present book is a vindication of the merits of William Wilde. Not that Dr. Wilson has tried to whitewash him. His moral deficiencies are admitted and their disastrous effect upon his career duly recognized. But the emphasis lies on the elucidation of Wilde's achievements. For this task Dr. Wilson, himself an otolaryngologist and a member of the staff of Steeven's Hospital in Dublin where Wilde was once a surgical apprentice, has gathered a wealth of original material which he presents faithfully and understandingly. Sir William's energetic figure comes vividly to life, although Dr. Wilson has refrained from any attempt at fictionalizing, so especially tempting in this case.

When Wilde embarked on his medical education in 1832 the "Resurrectionists" were still robbing graves to supply the dissecting rooms with

cadavers; by the end of his career modern surgery had been born. Thus his life covered a period when every year saw new and phenomenal advances in medicine, and William Wilde made no small contribution to them. The son of an Irish country doctor, Wilde received his medical training in Dublin where he was apprenticed to Abraham Colles. Here he also came under the influence of Graves and Stokes who subsequently became his lifelong friends. After qualifying as a surgeon Wilde determined to specialize in diseases of the eye and ear. At that time, the correction of visual defects was in the hands of quacks, and the "popular remedy for a discharging ear was to insert a piece of 'rusty bacon'" or "some wool from the left forefoot of a six-year-old black ram." Wilde undertook to place his chosen subjects on a scientific footing, and to this end he employed rational treatments and surgical procedures. His textbook on aural surgery, the first of its kind, was a classic for many years, and the hospital which he established and administered attracted students from all over Europe and especially from America.

But Wilde was not only a successful medical practitioner and author. He was also a lecturer popular with medical and lay audiences alike, and he edited a medical journal. In 1836 he was appointed Medical Census Commissioner of Ireland, an appointment which he held for life. Probably his most interesting medical report for the Census was that of 1851 which ran to nearly 600 folio pages and covered the decade of the great Irish Famine and the epidemics that accompanied it. Besides the statistics in this volume he contrived to include in tabulated form a history of Irish medicine from the earliest times. It was in recognition of his statistical work that knighthood was conferred upon him in 1864.

Wilde's remarkable and varied talents found expression outside the medical field too. He was a writer of more than average ability. A Mediterranean cruise inspired a two volume account of his observations and travels. The book was widely read and secured for its author a place in the literary world of the day. Post-graduate study in Vienna resulted in a descriptive book on Austria which incorporated a critical survey of the country's political and scientific life. Two later books on the Irish countryside proved to be his most popular works. One of these was reprinted as recently as 1936. However, the widest contemporary recognition was accorded Wilde's work in ethnology and archaeology. He is credited with the discovery of the lake dwellings of the Irish crannogs, antedating Keller's discovery of the Swiss lake dwellings by some fifteen years. His catalogues of Irish antiquities have remained unsurpassed to the present day.

Dr. Wilson has indeed presented Sir William Wilde's claim to fame most convincingly. And he has done much more. For there emerges from the pages of his book not only the story of an eminent physician from his student days to his social disgrace and decline, but also an account of the Victorian world in which he lived, the problems which beset it, and many of the men who peopled it. Moreover, Dr. Wilson's recounting of Irish history and

folklore, with which he seems to have far more than a passing familiarity, makes delightful reading for the uninitiated. Numerous illustrations drawn by the author add to the enjoyment of a well written and informative book.

JANET BROCK KOUDELKA

BARBARA M. DUNCUM. *The Development of Inhalation Anesthesia.* London: Oxford University Press, 1947. xvi + 640 pp. Illus. $12.00.

The aim of this book is to trace the beginnings and follow the development of those concepts and practices which have gone to the making of the science and art of inhalation anesthesia as it is today.

Dr. Duncum in her historical introduction gives an excellent political and economic background in the countries in which anesthesia was developed during the last half of the nineteenth century. She shows in a very interesting manner how political prejudice and national pride played a role in the development of various anesthetic agents.

The characters of the pioneers of the preparatory period of anesthesia are well delineated by the author. The controversies between Morton, Long and Jackson are brought out in great detail, and the author has given many timely quotations from current literature as a background to the anesthesia controversy. The reception of ether in England and on the Continent, and the vying of ether with chloroform is brought out in an impartial manner. There is a lengthy discussion of the cause of chloroform deaths culminating with the discovery of Levy that chloroform could attack the myocardium and does cause death in the early stages.

All types of devices employed in the use of general anesthesia, including pumps, pressure machines, pressure chambers, and masks of all kinds are described in the words of the inventor and shown by means of pictures or sketches in the volume.

The chapter on the jubilee of anesthesia is of especial interest and worthy of much commendation. The book ends with the development of anesthesia up to the dawn of the century, and then is epitomized by a summary of events in anesthesia beginning in 1772 and ending in 1911.

The reviewer heartily recommends this book to those interested in anesthesiology, as the detailed and historical data contained therein are seldom found compiled in any other volume. The author's style is lucid and her evaluation of anesthetic achievement appears to be devoid of prejudice and national pride.

JOHN C. KRANTZ, JR.

JESSE RANDOLPH PAWLING. *Dr. Samuel Guthrie, Discoverer of Chloroform.* Watertown, N. Y.: Brewster Press, 1947. 106 pp. $3.50.

Dr. Jesse R. Pawling's treatise on Dr. Samuel Guthrie, the discoverer of chloroform, is a refreshing brochure on the history of anesthesia. It brings into it a breath of much needed fresh air and illumination. Guthrie was a physician, chemist, inventor and manufacturer, who settled in Sackets Harbor, New York, in 1817. He invented percussion pills which were used in firearms in the entire New England area. Later he sacrificed two gallons of his best whiskey and treated it with bleaching powder (chlorinated lime) in order to prepare a sweet whiskey, which was named chloroform. Actually, his preparation of chloroform antedates that of Justus von Liebig, the German apothecary, and Soubeiran, the French chemist. Not only did Guthrie prepare chloroform, but he administered it several times to produce surgical anesthesia. All of this occurred in 1831, 17 years prior to the famous institution of chloroform as an anesthetic in Edinburgh by Sir James Young Simpson.

Pawling makes the interesting comment that during the Civil War in the United States over one million and a half pounds of chloroform were used to allay pain.

Not only is Pawling's volume an interesting contribution to anesthesia, but it gives a very excellent insight into life, medicine, commerce and culture as it occurred in Sackets Harbor in the early part of the nineteenth century. The narrative is engrossing and it is well documented with excerpts from *The American Journal of Science and Arts, The Journal of the Philadelphia College of Pharmacy* and other historical compendia.

JOHN C. KRANTZ, JR.

FRANK G. SLAUGHTER. *The New Science of Surgery.* New York, Julian Messner, Inc., 1946. 286 pp. $4.00.

Dr. Frank G. Slaughter has written a very interesting book for the layman on surgery. Medicine holds a fascination for the average person, and good books explaining phases of that subject in simple but comprehensive terms have long been needed.

Many people have been over-exposed to the articles written on various diseases, treatments, etc. which have appeared in magazines and newspapers. So often these have been well meant but too enthusiastic, and have not been technically accurate nor fully documented. It is a pleasure to recommend *The New Science of Surgery* as a reliable book on the subject. It is so clearly written that it would be difficult for the reader to become over-confident and yet it tells vividly of all the miracles of modern surgery.

RODMAN WILSON, M. D.
GWYNNETH A. GMINDER

GLADYS SELLEW and C. J. NUESSE. *A History of Nursing.* St. Louis: C. V. Mosby Company, 1946. 444 pp., illustrated. $3.75.

VICTOR ROBINSON. *White Caps. The Story of Nursing.* Philadelphia and New York: J. B. Lippincott Company, 1946. xvi + 425 pp., illustrated. $3.75.

Here are two books which depict the history of nursing, and two as totally different approaches as one may ever expect to find in histories of the same subject. Dr. Sellew and Dr. Nuesse approach the study from the sociological side, and have written an excellent textbook for a course in the history of nursing, which may further serve as an introduction to the course of study which is known among nursing educators as Professional Adjustments and Ethics. Dr. Robinson, on the other hand, sets forth the history of nursing as colorfully as he might have done in a historical novel, including the slightly known figures too, for greater detail in the total picture. He sees nursing history as a partial history of the emancipation of women.

Gladys Sellew, Ph. D., R. N., is Director of the Department of Nursing at the College of St. Catherine, St. Paul, Minnesota. Her co-author is C. J. Nuesse, Ph. D., who is an Instructor in Sociology at the Catholic University of America, Washington, D. C. Their book is a conventionally arranged textbook which includes excellent questions for discussion and study, and suggested readings at the end of each chapter. As might be assumed from the schools with which its authors are associated, the book is particularly complete on the Catholic Church's and Monastic Movements' influence on nursing history.

Victor Robinson, M. D., was Professor of the History of Medicine of the Temple University School of Medicine, and Lecturer on the History of Nursing at the Temple University School of Nursing in Philadelphia before his death last January. He wrote often on medical historical subjects, and had much success in the popular historical field. *White Caps* was his thirteenth book in this field since 1907. It is presented in an interesting style, with such colorful chapter titles as "Hospitals and Hospitality in Antiquity," "The Women of St. Vincent de Paul," and "A Shaker Bonnet in the Civil War." Its illustrations include a few fine photographs of old paintings and illuminations, and some modern subjects as the Army Nurse today. There are two informative appendices. The first is a table entitled "March of the Nurse," and the second is a section of Bibliographical Notes. The "March of the Nurse" is a useful list of the important contributors to the nursing principles from the Hebraic Era to the present. The bibliographical notes set forth a wealth of sources for further study along this line. This book should be of particular value for informing the general public about nursing history.

Each of these books has a purpose. Dr. Sellew's and Dr. Nuesse's book seeks to carry on the social understandings gained by nurses in the Total

War. They hope to disclose to the student the "relations between cultural systems and health and disease." Their scholarly study of trends does not quickly gloss over the history of health up to the emergence of nursing as a profession with Florence Nightingale. They include the cultural background which must be understood in order to see Florence Nightingale as a product of her own times.

Dr. Robinson, on the other hand, purposes to study the subject as "an episode in the history of woman," feeling that "the nurse is the mirror in which is reflected the position of woman in the ages." He sketches in the early history of the emancipation of woman quite briefly, dwelling longer on the more important figures in the movement, Florence Nightingale and Clara Barton. A lesser light, but briefly noted in most nursing histories, is honored by a whole chapter in Dr. Robinson's book: Mother Bickerdyke of Civil War fame who had a most interesting career. He includes much informative material about the growth of nursing in Russia and Europe in the modern era. All in all he writes a thoroughly readable story.

Both books make comments on the future of nursing and the need for the trained nurse, but neither makes any attempt to suggest what future steps may eventually draw enough nurses into the field to satisfy all the demands for them. Drs. Sellew and Nuesse name the three sources from which future demands will arise: needs of war veterans, expanding social security programs, and increase in nursing specialization. Dr. Robinson closes with the hopeful prayer that "the unity in nursing may be the sunrise of the unity of the diversified, divided and long quarreling children of Mother Earth."

HARRIET HICOK

Studies and Essays in the History of Science and Learning Offered in Homage to George Sarton on the Occasion of his Sixtieth Birthday 31 August 1944. Edited by M. F. ASHLEY MONTAGU. New York: Henry Schuman, 1947. xiv + 597 pp. $12.00.

The essays published in honor of Dr. George Sarton reflect in their breadth and variety of affiliation the characteristics that have marked his own conception of the history of science. These represent the harvest that has grown from his own seminal writing and teaching. Dr. Sarton's contention that the history of science is a meeting ground for scientists and humanists is aptly illustrated by the rich and varied contributions presented in this volume. In this sense they are a most appropriate tribute to the master whom they honor.

The volume contains 27 papers, of which six deal with medicine and biology, four each with mathematics, astronomy, and the ethical and cultural relations of science, three with the philosophy of science, and one each with social

science, technology, cartography, cosmogony, comparative religion and linguistics.

It is beyond the competence of this reviewer to evaluate critically all the papers in the volume, but a few brief remarks will indicate the nature of the contents.

J. B. de C. M. Saunders and C. D. O'Malley present a translation of Vesalius's letter of 1539 on bloodletting, accompanied by an introductory discussion of the early history of therapeutic bloodletting, with particular reference to the controversy in the sixteenth century on this subject.

Charles Singer discusses the philosophic background of Vesalius, emphasizing the dependence of Vesalius on Galen.

F. J. Cole presents a translation of William Croone's account of the development of the chick (1672). Croone was a preformationist and an ovist, and his account is important in the preformation-epigenesis controversy.

Conway Zirkle discusses the discovery of sex-influenced and sex-limited heredity, bringing the subject down to the present.

Harcourt Brown analyzes the relations of Buffon with British scientists in the Royal Society, thus illuminating Anglo-French cultural relations in the age of Enlightenment.

Richard H. Shryock undertakes to explain the lack of acceptance experienced by the theory of natural selection developed by William Charles Wells and first proposed in 1813. Shryock takes this case as a point of departure for a discussion of the dissemination of scientific ideas.

Victor F. Lenzen discusses Helmholtz's theory of knowledge, in particular his ideas on causality, perception, space, number and measurement.

Agnes Arber deals with the utility and abuse of analogy in science.

Robert K. Merton discusses the role of the intellectual in public bureaucracy. This is a subject which will undoubtedly be of increasing significance as more scientists enter government service, and Dr. Merton's paper deserves to be widely read.

There is a brilliant, penetrating paper on Galileo's Platonism by Ernst Cassirer, apparently one of the last things written by this distinguished philosopher before his death. Cassirer inclines to the view that Galileo was akin to Plato in spirit.

Among the other contributions are papers by G. de Santillana on "Positivism and the Technocratic Ideal in the XIXth century," on "Ethicogenesis" by Chauncey D. Leake, on James Joseph Sylvester by R. C. Archibald, suggestions for the better correlation of literature and science by M. F. Ashley Montagu, a biography of George Green by H. G. Green, as well as essays by Aubrey Diller, James R. Ware, A. K. Coomaraswamy, Solomon Gandz, Otto Neugebauer, Lynn Thorndike, Grant McColley, Paul Schrecker, J. Delevsky, Dorothea Waley Singer, and J. M. Vallicrosa.

The papers are preceded by a brief biography of Dr. Sarton by his

daughter, May Sarton; and Miss Sarton provides a fitting conclusion to the volume with a poetic tribute to her father, a plea for scholarship devoted not to the dead letter but rather to the vital spirit of humanism linking past and present.

GEORGE ROSEN

BERNHARD J. STERN and SAMUEL SMITH (editors). *Understanding the Russians. A Study of Soviet Life and Culture.* New York: Barnes and Noble, Inc., 1947. vi + 246 pp. $2.75.

For peoples to understand each other, it is necessary for them to be reliably and accurately informed. It need hardly be said that this is of the utmost necessity for an intelligent understanding of that most important and controversial of contemporary questions—Soviet-American relations. At the present time, as we all know, references to the Soviet Union are more likely to be characterized by heat than by light. Any attempt, therefore, to shed light on this important topic is to be welcomed.

In the volume under review, the editors have endeavored "to provide significant evidence for those who are sincerely eager to learn the truth about the Soviet people." To do this they have selected articles previously published elsewhere, and have arranged them under nine headings: Soviet Principles and Goals; the Land and the People; How the Russians Govern Themselves; The Work of the People; Soviet Science and Medicine; Soviet Art, Music, and Literature; Social Life in the U.S.S.R.; Education in the Soviet Union; Soviet Law and Justice. In addition there are seven appendices —The Constitution of the Soviet Union; The Soviet Census of 1939; Table of Soviet Nationalities; Economic and Cultural Progress, 1933-1938; State Budget of the U.S.S.R. for 1945; Five Year Plan of the U.S.S.R. for 1946-1950; and an Edict of the Supreme Soviet on State Aid for Mothers and Children.

Among the 50 odd contributors may be mentioned Sumner Welles, Joseph Stalin, John Hersey, John N. Hazard, Maurice Hindus, Henry E. Sigerist, Beatrice Webb, Richard E. Lauterbach, V. M. Molotov, P. L. Kapitsa, Irving Langmuir, Edgar Snow, and J. D. Bernal.

Of greatest importance to readers of the *Bulletin* is probably the section on Soviet Science and Medicine, and in particular Dr. Sigerist's contribution on "The Organization of Soviet Medicine." It is written in the usual lucid style that we have come to expect from his pen, and contains an interesting table on the growth of medical facilities in the U.S.S.R., from 1913-1941.

All in all this is a useful volume for all those who want to obtain factual information about the Soviet Union. The appended documents are of considerable value, and there is an index.

GEORGE ROSEN

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